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THE FARMER'S DIGEST

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FARMER'S DIGEST
Fort Atkinson, Wisconsin

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- Keeping Silage Dry
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- Law On The Farm

The **Farmer's Digest**

Volume 20 **January 1957** **Number 7**

The Government's Big Hope for Farming

A big farm research program is planned to expand farm markets. Secretary Benson calls it the "most important method of promoting long range welfare of farm people . . ."

Condensed from The Wall Street Journal

Lee M. Cohn

FEDERAL farm researchers, who claim they hold a key to agriculture's salvation, are getting set to demand hefty sums of money, elaborate subsidy and incentive schemes, and other lubricants to turn that key in the lock. The researchers expect Congress to say yes to most of their proposals.

"We're at the threshold in many fields where a good push would really get things rolling," an American Department official exclaims. "Take manufacture of motor fuel from grain alcohol. We have no technical difficulties. It works. Overnight, we'd have no grain surplus. But we can't lick the economic problems without subsidies to make the process competitive with gasoline."

As another subsidy possibility, an expert cites safflower, a relatively new crop yielding edible oil and raw materials for plastics and chemicals. "Safflower," he declares, "may some day replace millions of acres of wheat. I think it has the tremendous potential in the West that soybeans fulfilled in the Midwest and other more humid areas. To encourage farmers to switch to safflower, the Government could guarantee markets, or perhaps incentive

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prices, for a limited number of years."

Wanted: More Industry Research

And, an official says, "we want industry to do more research, development and exploitation of new products and markets on its own. The Government could encourage activity in many ways. Perhaps a variation of the tax depletion allowance that gets oil companies to drill wells. Perhaps tax-free profits on new products for a number of years. Maybe rapid amortization for tax purposes."

These are among the research-boosting possibilities being sorted by the President's Commission on Increased Industrial Use of Agricultural Products. The commission was created by Congress in 1956 to offer advice on the task its name suggests. The group is headed by J. LeRoy Welsh, Omaha grain man, and includes such members as George H. Coppers, president of National Biscuit Co., and Dr. Frank J. Welch, dean of the University of Kentucky's College of Agriculture.

The commission is charged with presenting recommendations by June 15 of this year, but it hopes to offer a preliminary report in January. It's appraising the potential of research now under way and seeking ways to step up its impact. Dr. Guido E. Hilbert, the commission's research director, explains it is "trying to shorten the gap between research and industrial use."

"Spending can't stop in the laboratory," a spokesman says. "Our big weakness is development. After the scientists perfect a new product or process, you need pilot plants to get actual production started, you need campaigns to develop markets, you need practical tests in industry. Beyond research, you need big development contracts, something like the Defense Department uses to get new weapons from the drawing board into the field. The commission is seriously considering recommending a major development program to Congress."

Request for More Money

But such proposals won't go to Capitol Hill just yet. First, in January, President Eisenhower will request more money for present farm research programs.

"The amount will be substantial," says a top official. "The biggest money increases will be for research on new crops, development of new and broadened uses for existing crops, expansion of markets and reduction of the farmer's production costs. They're the fields we're pushing."

To persuade lawmakers to loosen the purse strings, farm researchers will dangle their past achievements and most promising new projects as bait. The quest for new crops and new

markets is likely to head the list of exhibits.

Bamboo is considered a likely source of wood pulp for papermaking, perhaps yielding a better per-acre return than pine, and the Agriculture Department is sponsoring test plantings to perfect profitable growing methods for the Southeast. Officials hope bamboo may replace hundreds of thousands of surplus cotton acres and maybe some wheat land.

The fertilizer industry indicates that farmers are seeking more pelleted fertilizer. Biochemists report that farmers like the way pelleted fertilizer handles and the way it drills. Farmers who want to use pelleted fertilizer should order early and accept delivery early.

Wild tropical yams, researchers have discovered, are rich in cortisone, the hormone used to treat arthritis. "Right now," an expert reports, "we're trying to develop productive, high-quality strains to permit profitable cultivation. We'll soon be ready to test these seeds on a substantial scale." Other potential cortisone resources: Agaves, yuccas and some lilies.

Substitute for Waxes

A Southwestern desert shrub called Simmondsia chinensis yields wax which could substitute for sometimes-scarce imported waxes used in polishes, shoe stains and carbon paper. Scientists are collecting seeds for tests which will determine whether the shrub can wring profits from the dry Southwest.

Plant breeders are developing a type of corn, dubbed amylo, for production of a starch they think can be processed into tough fibres, plastics and protective films for food. Since the substance is digestible, it might make an ideal casing for hot dogs. Another corn-starch variety, experts report, "shows tremendous promise" for tanning leather and hardening plastics and as an ingredient for paper and adhesives.

Technicians also are working on manufacture of paper and paperboard from wheat straw; rubber-like products from oilseeds, animal fats, sugar cane, turpentine and rosin; paper products and surgical sponges from corn starch; plasticizers and synthetic detergents from animal fats.

Methodical analysis of hundreds of plants, cultivated and wild, continues. "We've identified over 100 chemical compounds in alfalfa, for example," says a researcher. "Some of them will prove useful."

Federal agricultural research spending has climbed sharply during the past several years, ever since Agriculture Secretary Ben-

son called research and education "the most important methods of promoting the long-range welfare of farm people and the nation."

New Increases Likely

The Government expects to spend $103 million for farm research during the fiscal year ending next June 30. That's $20 million more than last fiscal year, $44 million more than in fiscal 1954. Further major increases shape up for next year, the year after that, and as far ahead as officials can see. The states are expected to spend $84 million this fiscal year, boosting total governmental expenditures to $187 million from $160 million last year and $126 million in fiscal 1954. On top of that, industry is spending an estimated $150 million to $200 million a year.

"But," a Federal official claims, "research spending must be increased several-fold before it can make a real contribution to cutting down the surplus."

While much research aims at glut-cutting through development of new markets and new crops, officials are trying to roll back other scientific frontiers.

Manpower, Yields, Costs

Production research in the past couple of decades has taken long strides in conserving farm manpower, boosting yields and holding down costs of feeding and clothing the nation. Undersecretary of Agriculture True D. Morse estimates that "if farmers today were no more efficient than they were in 1940, consumers would have to pay $8 billion to $10 billion more (a year) for the food they purchase."

Crops have cashed in more than livestock on technological advances. Plant breeders develop endless variations of strains tailored for resistance to insects and disease, adaptability to growing areas and high yield. Rust-resistant durum wheat is an outstanding recent success; the disease had cut deep into production of this macaroni material. Researchers are nearly ready with varieties of winter oats and barley designed to thrive in the Southwest and yield more grain per acre.

Growth regulations through chemicals and control of light promises to produce crops at the farmer's convenience. A substance called gibberellic acid, used in paste applied to stems of young plants, made snap beans, soybeans, peanuts and other things grow two to three times the height of untreated plants in three to four weeks. Among the advantages is rushing plants like peanuts through early stages when they're subject to disease.

The antibiotic drug terramycin, say researchers, "has increased egg production by from 6% to 17% and improved feed efficiency on a range between 3.7% and 18% when added to chicken feed.

They say it works "by bringing pullets to peak production faster, by maintaining a higher rate of production from the second to the eighth month, and by keeping hens laying beyond the eighth month, when production normally falls off."

Mechanization continues to expand. Researchers are working on harvesters for various fruits and vegetables; improved chemicals to strip cotton plants of leaves so harvesters don't pick trash along with fibre; and machines to combine several operations—like plowing and planting—in one.

"Fertilizers, cultivation techniques and irrigation have progressed, but we still have a long way to go," an expert observes.

Much of this research, of course, tends to boost, rather than cut, per-acre yields of crops already in top-heavy supply. But scientists see no paradox: "If we can produce higher yields at less cost, farmers can use the acres they save to produce things that are more in demand, helping bring agriculture into balance."

Winter Beef Cows On Corn And Grass From Silo

Consider both corn silage and grass silage to carry your beef cows through winter, says E. R. Hauser and E. H. Hoch, beef specialists at the University of Wisconsin.

After three years of tests, they recommend corn silage plus legume hay and minerals for nursing cows, and grass silage plus hay and minerals for dry cows if both kinds of silage are available. The mineral should be trace-mineralized salt with a source of phosphorus, such as bone meal or calcium phosphate.

If you have both kinds of silage, Hauser and Hoch think it would be a good idea to feed dry cows on grass silage because they won't get too fat. Then switch them to corn silage about a month after calving, so they'll give more milk. If you can't switch to corn silage, it would probably be best to add some corn or oats to the grass silage to increase milk production of the cow as the calf needs it.

Each cow will eat around 25 pounds of silage and 20 pounds of hay daily. The proportion of hay and silage can be varied according to the amounts of each available. The cows in the test ate about 1¾ tons of hay and 2¼ tons of silage per head during the wintering period. —*Wisconsin Extension*

What's Ahead for Farmers In '57

Annual farm outlook forecasts farm income about the same as 1956. However, there are opportunities . . .

Condensed from Michigan Farm Economics

TOTAL output of red meats will decline moderately in 1957 after attaining an alltime high of 27.5 billion pounds in 1956.

This past year was somewhat unusual in that a cyclical peak in both pork and beef output occurred in the same year. Per capita consumption of red meats reached 163 pounds; this equals the previous record set in 1908 and is some 20 pounds greater than the level of consumption in 1950. This general increase in the level of red meat consumption has been in beef and veal.

Compared with 1956, the rise in consumer purchasing power, along with a moderate downturn in total meat production, should bring about a higher level of livestock and meat prices during the first half of 1957.

Cattle

Cattle prices will average higher during the first half of 1957 than during early 1956. A slightly smaller beef supply, increases in consumer purchasing power, a growing population, and reduced supplies of pork all point toward a higher level of beef prices in the year ahead.

Beef consumption is expected to ease back to about 81 pounds per person in 1957 compared with an alltime record of 83 pounds in 1956. During the first half of 1957, most of the small decrease in supply will be centered in the top grades of steers and heifers.

During early 1956, excessive supplies of long-fed, heavy steers depressed prices; the differential between the higher and lower grades became unusually narrow. This situation was dramatically reversed during the last half of 1956 when scarce supplies of the top grades of cattle and large runs of grass cattle from drought-stricken areas greatly widened the price differentials between grades.

Prices for Choice and Prime cattle will decline from the highs reached in late 1956 as supplies of these grades increase seasonally during the winter months.

Reprinted from Michigan Farm Economics, Cooperative Extension Division Michigan State College, East Lansing, Michigan

If farmers follow an orderly pattern of marketing, prices for Choice slaughter steers at Chicago will probably average between $22 to $24 during the first half of 1957. This would be $2 to $3 above last year's prices during the same period. It seems unlikely that prices for these top grades of cattle will climb in the last half of 1957 back to the levels reached during the August-September period of 1956. The fall to spring seasonal rise in prices for cull dairy cows and the lower grades of steers and heifers will be greater than usual this year.

The extreme drought in large areas of the Southwest has forced the overall marketings and has reduced the overall demand for cattle for feeding and grazing. The large corn crop in the Central and Eastern Corn Belt puts farmers in this area in a favorable position to make average profits from cattle feeding during 1957.

Hogs

A larger than usual seasonal price rise is expected during the spring and summer of 1957. Hog production is on the downtrend after rising for 2 years. The 1956 fall pig crop in the major Corn Belt states was reported to be down 8 per cent from a year ago. With near average relationships between hog and corn prices in late 1956, a small decline is expected in next spring's pig crop. By late next spring or early summer, hog prices will again push above $20. Farmers who have large corn supplies might well consider buying feeder pigs to be fattened and sold during the May-July period.

Sheep and Lambs

Sheep producers can look forward to another year of favorable returns in 1957. The number of stock sheep on U. S. farms is holding near 27 million head after declining some 45 per cent from the 1942 peak. Recent reductions in the sheep population in the western states are being offset by increases in the eastern states. Through a direct payment program, the price of wool will again be supported at about the same level as during 1956.

Prices for fed lambs this winter should average slightly higher than a year ago. Although more lambs may be fed in Corn Belt feed lots, the number carried on Great Plains wheat pastures will be unusually small.

Dairy

Prices received by United States dairymen for dairy products in 1957 are likely to average very near those received in 1956. Milk cow numbers are down about 1 per cent compared with a year ago. Production per cow is still increasing and herd sizes are becoming larger. Feed supplies are ample. Per capita fluid milk sales will continue at about the 1956 rate. The surplus milk situation

will not be greatly aggravated although purchases under the price support program will still be needed.

Higher production in 1957 and about the same average price for whole milk will mean somewhat higher cash receipts from dairying. Higher production expenses, however, may leave net income only slightly higher than in 1956.

Farm Outlook In Brief

The general direction of the economy will be up, at least during the first half of 1957.

Cash receipts from farm marketings will be up in 1957, but so will farm production expenses, so farm income from farming will probably be about the same. Government payments to farmers will rise next year and total income of farmers should be slightly higher.

Most everything that farmers buy for farm production will be higher.

The cost of living is expected to rise 2 or 3 per cent in 1957.

Credit will continue to be tight and interest rates will be higher.

Farm land prices will continue near present levels.

Supplies of feed grains and high protein feeds will be about the same as last year's large supply.

Feed grain prices will be about the same as last year, but protein supplement prices will be lower.

Higher production in 1957 and about the same average price for whole milk will mean somewhat higher cash receipts from dairying. Higher production expenses, however, may leave net income only slightly higher than in 1956.

Prices for the better grades of fed cattle will average 2 to 3 dollars higher during the first half of 1957 than a year earlier.

The decline is the 1956 fall pig crop, along with a stronger consumer demand, is expected to bring hog prices back above $20 by next summer.

1957 will be a good year to raise more pullets for laying flock replacement.

Corn supplies are large. Prices probably will stay well below the loan rate to farmers who complied with the government program.

With the largest crop of soybeans on record going to market, prices will not get very far above the national average loan price of $2.15.

Enzymes — The Newest Feed Additive

Enzymes is a word you will be hearing a lot more about. The first one to break through for commercial use is pepsin — others will follow . . .

Condensed from Successful Farming

Vernon Schneider

ONE OF THE most significant developments in animal nutrition has unfolded before us during the past 6 months. Pepsin, long used by humans to aid digestion, has now found its way into livestock production. The full story of its discovery—and potential use—can now be told.

Pepsin, one of a long string of enzymes, is the first to find its way into commercial use. *It opens the door to the use of other enzymes in the future.*

Dr. Damon Catron, swine nutritionist at Iowa State College, calls the use of pepsin in baby-pig rations a bench mark in animal nutrition. "There is no question but what the baby pig is deficient in certain digestive enzymes. *This basic scientific discovery will have a profound effect on the formulation of baby-pig rations and the management of baby pigs in the future,*" says Catron.

"Research indicates that all prestarter rations for baby pigs under 2 weeks of age should be fortified with pepsin. Feed manufacturers will probably find that it pays to fortify their starter rations with enzymes for pigs up to about 5 weeks of age."

To date, workers at Iowa State College have fed pepsin to 895 pigs at different levels, starting at about 1 week of age through 5 weeks. The response of the baby pigs to pepsin in terms of gains and feed efficiency has been quite variable. Increase in gains from 1 to 5 weeks, using 1 per cent pepsin supplementation, ranged from minus 8 per cent to plus 40 per cent—an average of plus 6 per cent. The feed saving during this same period due to the feeding of 1 per cent pepsin ranged from minus 12 per cent to a plus 21 per cent—an average of 4 per cent increase in feed efficiency.

According to Catron, it appears that there is a direct relationship between the incidence and severity of scouring and the response to pepsin supplementa-

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tion. The more frequent and the more severe the looseness of scouring, the greater the response to pepsin supplementation.

The younger the pig the greater the value of adding pepsin. In tests at one commercial company, the addition of pepsin resulted in increased gains of 29.5 per cent the first week, 11 per cent the second week, and no increase the third. The pigs weighed 10 pounds (2½ to 3½ weeks old) when the test was started. For the first 2-week period, 6½ per cent less feed was required for equal gains.

Enzyme supplementation is not a "cure-all." A good basic ration is still just as important. *Pepsin should be used as an additive and not as a complete milk replacer.*

Here are answers to some of the common questions concerning enzymes in general and pepsin in particular:

Q. What are enzymes?

A. Enzymes are organic compounds which bring about changes in other organic compounds without themselves being changed or broken down. A good example of enzyme action is furnished by ptyalin, the enzyme in the saliva of man. This changes the starch of food, which is insoluble, into maltose (milk sugar), which is soluble.

Q. Do enzymes usually speed up or slow down normal chemical reactions?

A. The speed of the chemical reaction is usually increased due to enzymes. An enzyme allows a chemical reaction to proceed at a satisfactory rate at body temperature. For the same rate of chemical reaction without the presence of the enzyme, a much higher temperature would be necessary. This higher temperature would destroy an animal's body tissues.

Q. What are some of the normal reactions of the body that enzymes affect?

A. Enzymes are necessary for almost every chemical reaction in the digestion of food in the mouth, stomach, and intestine. When starches are changed to sugars, proteins to amino acids, fats to fatty acids (all of which are necessary for digestion), enzymes help.

Q. What is pepsin?

A. Pepsin is a proteolytic enzyme. It breaks the complex molecules of protein down into simpler compounds known as peptones and proteoses. These compounds are later broken down to amino acids by other enzymes.

Q. Do animals normally secrete pepsin?

A. Yes, an adult animal normally secretes pepsin as a part of the gastric juice in the stomach. It has been measured and found that the pepsin-secreting system of the baby pig does not function fully until the pig is approximately 7 or 8 weeks old.

Q. To what age pig does pepsin show greatest response?

A. The younger the pig, the greater the response. The pig's pepsin-secreting system develops gradually from the time it is born until the pig is 7 or 8 weeks of age. Extra pepsin in the feed makes up for the pepsin the pig doesn't have.

Here's our problem: the United States agricultural factory now is geared to produce four to six per cent more agricultural products than the current market will take at generally accepted prices.

Q. What does pepsin do for the baby pig?

A. This is not known for sure. It probably breaks down protein quicker than the baby pig can do it by himself. Some tests have shown that it allows the substitution of low-cost soya protein for higher-cost milk protein. Other tests show that it gives an additional boost when a ration high in milk is used. It appears to give best results as an additive to a high-quality ration.

Q. Does pepsin help control pig scours?

A. No, pepsin does not control or stop pig scours as does the feeding of vitamins and antibiotics. It has been noted that scouring pigs gain faster if they have pepsin in the ration. The pepsin probably helps the pig make better use of the feed when the pig is scouring.

Q. What is the source of pepsin used in baby-pig feeds?

A. The source of pepsin is the inside lining of hogs' stomachs. These linings are removed from healthy hogs at packing plants. This material is ground and concentrated to a dry material.

Q. Can pepsin be made synthetically?

A. Pepsin cannot be produced synthetically at the present time. It is quite unlikely that pepsin will be synthesized in the near future because it is a complex protein molecule and no one has been able to synthesize protein.

Are You Really In The Hog Business?

Take this simple test to learn where you stand . . .

Condensed from Tennessee Farmer
Julius S. Hurst

SOME FARMERS are in the hog business. They are raising big, healthy litters of top grade hogs, and they are making a profit when a profit is being made. When the profits are good, they are really cashing in.

Some other farmers are in the hog business, too. They are raising some big litters and lots of small litters of all types of hogs. When profits are good, they make a little. In most cases they are losing money, because they are just fooling around.

If you really want more pigs, better, faster-growing hogs, better grades, bigger prices, and greater profits, then follow these proven practices which profit-making hog raisers are using:

A. Have Right Type of Breeding Stock

The right type of breeding stock does not mean any particular breed, expensive blood, or long pedigrees. But it does mean the right type sow and boar.

A very long, relatively lean sow with a good arch, deep sides, heavily muscled hams, clean, smooth head-neck-and-legs, is the kind we must have. Sell the blocky, chuffy type gilts and sows.

Sows should come from litters of 10 to 14 pigs. They should have 12 to 14 evenly spaced, well developed teats. These extra teats are insurance against both undernourished and orphan pigs.

The boar should be the same general type—long and lean, and from a sow which also had large litters.

At breeding time, increase the sow's feed, both protein and grain. This should be done 10 days to two weeks before breeding where she will be on the grain when bred. Tests show this means more pigs.

Many breeders believe double breeding results in more pigs. They breed on the first and second or third day of the heat period.

B. Give Proper Care and Feed to Bred Sow

From breeding time until farrowing time is one of the most important periods in the production of good strong, healthy pigs,

Reprinted by permission from The Tennessee Farmer, Box 524, Nashville, Tenn.

Check on left if you follow the practice, on right if you do not. Give yourself 10 points for each "I Am" and 10 points for each "I Am Not." Be completely fair in grading.

I AM	PRACTICE	I AM NOT
	Are you culling your fatty type sows and switching to meat type sows and boars?	
	Are you feeding your sows extra before breeding? And plenty of protein, minerals, water and enough grain to keep sow in fair flesh from breeding till farrowing?	
	Are you washing your sow, separating from rest of herd, cutting down on feed 4 days before farrowing and feeding a laxative type feed to condition her for farrowing.	
	Are your sows farrowing in pens with guard rails, or better still in a farrowing stall?	
	Are you present at farrowing time, drying off pigs, nipping needle teeth, dipping navel cords, and getting them warm when needed?	
	Are you creep feeding pigs after two weeks, and giving sow plenty of minerals, proteins and grain for the heavy sucking period for the next six weeks?	
	Are you vaccinating for cholera and erysipelas strictly according to recommendations, and worming at 10 weeks?	
	Are you keeping pigs on clean ground and feeding them free choice all they can eat of supplement, grain, and mineral mixture plus plenty of fresh water from weaning until selling? Are you grouping your top hogs according to looks as well as weight, and selling on a terminal market to get advantage of strict classing?	
	ADD UP YOUR SCORE	

which grow off fast and give good gains.

Proper feeding is the key in this period. Corn alone is a very poor feed for a bred sow. Without supplement, corn alone means dead, or weak and runty pigs.

You must have a balanced diet for the sow. This means four MUSTS. 1. Proteins, 2. Minerals, 3. Grain, 4. Water. If you leave off any one of these, you are cutting possible profits.

Proper feeding and care during the time the sow is carrying the pigs means the following things: more live pigs, larger pigs, stronger pigs, faster-growing pigs, and heavier pigs at weaning time. And the bigger they are at weaning time, the faster they will grow after weaning.

Where will you get your proteins? Either out of tankage, commercial hog supplements or good succulent pasture. Hog raisers who are stingy with protein supplement are not saving money; they are losing it.

Where will you get minerals? Either from good pasture or from a mineral mixture of ground limestone, bonemeal, or ground rock phosphate and salt. Sows need some of this for the pigs to do their best.

How about grains? Corn is good. Wheat, barley and oats are also good. The sow should build up flesh from the grains for the hard sucking period to come. But she should not be too fat. Too many farmers overfeed before the pigs are born, and underfeed after they get the sow on full ration.

And now for the water. Always have fresh water before them.

Why all these? Because little pigs are formed from three main things. They are proteins, minerals, and water. If you don't feed the sow, she cannot feed the pigs being formed.

Now give the sow space in which to get exercise. If necessary, water them in one place and feed in another just to get them to walk. This seems unimportant, but it means money in your pocket six months later.

C. Give Proper Care at Farrowing Time

One man got up at 6:00 o'clock, went out to the barn and found 11 pigs, six walking around and five crushed. Nearly fifty per cent of his crop gone. Another man did not have time to run a wire into the farrowing pen for a heat lamp. It turned cold. When he got to the barn next morning, he found eleven frozen pigs. This man had a one hundred per cent loss.

Another man did the following things and he saved every pig. You can, too.

1. Remove the sow from the rest of the herd four days before farrowing. Wash her well to remove germs and parasite eggs.

2. Cut her ration to half just four days before farrowing. Feed some kind of laxative feed like linseed or alfalfa meal or wheat bran. This removes the corn packed manure, and conditions the sow for farrowing.

3. Have a clean farrowing pen, with guard rails or better still have a farrowing stall which is the best insurance against crushing pigs.

4. Be around close in case the sow needs help.

5. Dry newborn pigs, wipe membrane from nose, break out eight needle teeth to prevent injury to pigs and sow's udder. Dip navel cord in iodine to prevent joint swelling. Provide a heat lamp for pigs in cool weather. Be sure all pigs get some of first colostrum milk.

6. Remove afterbirth and bury.

7. Give sow fresh warm water on day of farrowing, nothing else.

8. Second day. Give wheat bran or shorts in lots of water. Add five tablespoons of Epsom Salts to feed on this day.

9. Gradually increase the sow's feed until she is on full ration in two weeks. Start with a little grain on third day and supplement on fourth.

D. Control Diseases and Insects

Pigs infested with worms, covered with lice, and subject to every known hog disease are poor prospects for profit.

1. To prevent lice and mange, be sure pigs are farrowed in a clean pen. The sow should be washed clean before she is placed in pen.

2. Keep pigs on clean ground. Turning pigs into an old cob-covered lot is like giving them a capsule of worm eggs.

3. Vaccinate all sows before breeding. Then vaccinate pigs two weeks before weaning or two weeks after. Vaccinate for both Cholera and Erysipelas.

4. Scours usually result from feeding the sow too much feed too soon or from damp, dirty quarters.

If the pigs do scour, cut sow's ration in half, feed lime water or baking soda, and keep quarters clean.

Cleanliness and care are the best defenses against all diseases and parasites.

After reaching this point safely, pigs are on their last lap to the profitable market. Whether they gain fast or slow, grade high or low, depends a great deal on proper care and feeding from two weeks to five to seven months.

1. Provide creep for pigs at two weeks of age. Keep pig starter and grain before them. This prevents loss or slackening in growth at weaning time.

2. Give pigs all they will eat of protein supplement, good pasture when possible, grain and mineral mixture. Self feeders eliminate daily feeding. Feed be-

fore pigs at all times on a free choice basis has proven its worth. It is the cheapest way to get a good hog to market quickest.

3. Provide plenty of fresh water all the time—not twice a day.

4. Provide ample shade for pigs. Hot, dry summer days wilt pigs as much as they wilt you.

Production and cost account records are the only means of measuring success or failure in farming. Complete records stop the leaks and are your guide to profits.

5. In feeding antibiotics, be sure they are included in your ready mixed feed, or know what you are doing in mixing it with your own feed. Don't guess.

Now the pigs are ready for market. Put the lean top hogs in one group. Don't mar the beauty, eye appeal, and grade of a load of top hogs with two or three chuffy cob rollers. Then sell on terminal markets to get the benefit of classing and the very top price, and maybe ten cents more.

Group the chuffy boys together and sell them some place where hogs are sold by weight instead of both weight and conformation.

Now sit down and shake your own hand. YOU ARE IN THE HOG BUSINESS.

Indoor-Grown Livestock Is Coming Thing

Most livestock on good commercial farms in the middle west will be reared in confinement in another 10-15 years, believes a Michigan State University agricultural economist.

John Doneth points out that the trend towards specialization and larger enterprises will encourage the move toward confinement rearing.

Better control of environmental conditions such as temperature and humidity will be possible, he contends. At the same time, costs of equipment and buildings per unit of livestock produced will be lower.

This confinement trend will be true especially for fattening hogs, dairy and feeder cattle, he says. Poultry has already well started in that direction.

Doneth cites a Michigan farmer who has gone to confinement rearing entirely. The farmer and his son are milking 50 dairy cows, feeding 100 steers, fattening out 75 hogs each year and farming 450 acres of cropland. Except for small lots, this farmer has no fences on the farm. —*Michigan Extension*

Let's Study the Dairyman's Record

Here are reasons why some dairymen make as much profit from 16 cows as others make from 50 cows . . .

Condensed from Hoard's Dairyman

E. T. Itschner,
Extension Dairyman, University of Missouri

BILL DAIRYMAN sits up real straight. "Did you say 16 cows bring in $3,000 of labor return? Why, that's just about what we cleared from our 50 cows!"

For the first time it comes home to Bill that he is raising feed for feeding, and milking three times as many cows as his neighbor and getting no more net return for his labor and management. For the first time, he realizes how much difference in net returns there can be between two herds that are on almost adjoining farms.

Bill has learned that high volume is necessary to pay overhead costs these days. But now he thinks maybe he's been going about it in the wrong way. He's been milking more and more cows to keep volume up, working more hours, too. Maybe there is a better way to increase the size of one's operation than just to milk more and more cows?

Joe Neighbor nets three times as much per cow. He needs fewer cows. He has high production, but he feeds heavy, and that costs —or does it? Yes, Joe does give his cows more grain. In fact, 30 per cent more feed all told—but he get's nearly 55 per cent more milk per cow! Maybe there is a way to cut down on some of this work.

It Takes More Feed

Joe feeds heavy and uses only the best-quality hay. He actually gets more pounds of milk per pound of grain and has a lower feed cost per hundred pounds of milk than the average. What is really odd is that Joe's feed cost is only 17 per cent lower per hundred pounds of milk—yet he comes out with more than three times the net labor return!

Something like this is apt to go on in Bill Dairyman's mind when he finds his herd fits in with the low group of D.H.I.A. herds while Joe Neighbor's herd compares with the high group that

Reprinted by permission from Hoard's Dairyman, Fort Atkinson, Wisconsin

realizes three times the return per cow.

Bill is apt to start asking questions—real pointed questions of Joe and his county agent. Then, of course, he is on the way.

All this is apt to get started when D.H.I.A. members get together to really study their herd record books at a neighborhood meeting. Each dairyman is assisted in laying his herd record along side three groups of herd records:

1. The average of the low herd in each D.H.I.A.
2. The average of all D.H.I.A. herds in the state, and
3. The average of the high herd in each D.H.I.A.

Differences in amounts, kinds and quality of feed, in markets, in breeding and differences in management appear, which often point out where changes may need to be made.

The D.H.I.A. record book is a source of much valuable information in addition to providing production records on the individual cows and the herd. Careful study brings to light other factors that can aid the dairyman in improving his herd's efficiency if he will study the record. Particularly is this true if he can compare his operation with various groups of dairy farmers from the same locality, as he can in the table which lists the averages of the three groups mentioned above and has space for the individual dairyman's herd record.

Usually the low group includes many new herds that are not under way on a program as yet. Probably their buildings and equipment leave something to be desired and some do not have as good a market as others. Still others need better breeding and almost all could improve their feeding practices.

Actually, when the records have been worked out for comparison, simple graphs are drawn to show:

(a) The monthly pattern of production and feed costs.

(b) Milk feed ratios.

(c) Age of cows in the herd.

(d) Percentage of the herd dry each month.

(e) Freshening interval of each cow.

(f) Reasons why cows are disposed of.

(g) Production of each cow that has completed a year's record.

With these graphs you can't help but bring out facts and information which will improve efficiency if acted upon.

Many Reasons for Low Production

Weaknesses brought out on an individual dairy farm cover everything from feed of low quality (particularly hay, silage, and pasture) to poor breeding, sloppy breeding records, neglect of the cows during the cropping season, breeding trouble, and many

others. Some faults are brought out plainly; others we can suspect.

The shortcomings of Bill's herd in the low group as compared to Joe's herd that ranks in the top group often can be called simply "low production per cow." This can have a dozen causes and usually several do appear in the study. Whatever the cause *production per cow must come up* if the efficiency of the herd is to be raised.

It goes back to the simple fact that half or more of the cow's daily ration goes for maintenance, and the cow that produces 50 pounds of milk per day must be maintained only two days to market 100 pounds of milk. But the cow that only yields 20 pounds of milk a day must be maintained 5 days for each 100 pounds marketed. For actual milk production, one cow uses about as much feed per 100 pounds of milk as another; but the poor cow, being limited in capacity or limited in feed nutrients must be kept longer in order to produce a given amount of milk.

To be more specific, if we check the total digestible nutrients required for average cows in the low and in the high groups in the table, we find differences like those in chart 1.

These figures show why low-producing cows are less efficient. Cow A requires 4.55 days to produce 100 pounds of milk. She needs 16.2 pounds of TDN (total digestible nutrients) per day or

CHART 1	Cow A low group 22 lbs. milk daily	Cow B high group 35 lbs. milk daily
Daily requirements:		
For maintenance (1,200 lbs.)	9.2 lbs. TDN	9.2 lbs. TDN
For milk production	7.0 lbs. TDN	11.2 lbs. TDN
Total for one day	16.2 lbs. TDN	20.4 lbs. TDN
Days required to produce 100 lbs. milk	4.55 days	2.86 days
Pounds TDN required for 100 lbs. milk	74 lbs.	58 lbs.
Per cent of feed that goes for maintenance	57	45
Per cent of feed that goes for milk production	43	55
Feed cost per 100 lbs. of milk at 3 cents per lb. TDN	$2.22	$1.74

a total of 74 pounds of TDN worth $2.22 to produce 100 pounds of milk. Of this 57 per cent went strictly for maintenance, 43 per cent for milk.

Cow B, however, requires only 2.86 days to produce 100 pounds of milk. She needs 20.4 pounds of TDN per day or a total of 58 pounds of TDN worth $1.74 to yield 100 pounds of milk. Only 45 per cent of her nutrients go for maintenance; 55 per cent are turned into milk.

Compared to Cow B, Cow A is only 78 per cent as efficient in the use of feed.

A cow that is not bred within 120 days following calving may cause a loss of as much as $40 to her owner if she is not safely with calf. Each day that a cow remains unbred beyond 120 days after calving reduces her life time production by one pound of butterfat.

Nor should we overlook the fact that Bill, in order to make $3,000 of net return, keeps 50 cows and produces 334,500 lbs. of milk. With a better herd Joe makes $3,000 of net return with 16 cows. In doing so he markets only 166,736 pounds of milk. Joe doesn't have to add so much to the milk supply in order to make a living. He doesn't have to strain his farm and back so much to meet costs.

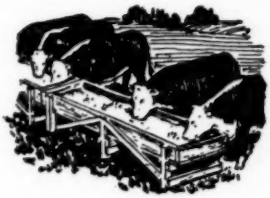
True, he may keep as many cows as his farm and labor can handle comfortably, but with his better return he is able to, in turn, improve his equipment, his farm and his standard of living more easily.

It is most rewarding when D.H.I.A. members meet to examine their herd books and to get some of these factors and facts worked out and recorded. "It's the best D.H.I.A. meeting I've ever attended," say the members, even though it takes most of the day to get the job done right.

For Frozen Farm Fingers

An electrically heated steering wheel has been invented by a British auto worker. Last winter it went through four months' testing on an open farm tractor, keeping farm workers' hands warm in below-freezing temperatures. The heating element can either be built into the rim of the wheel during manufacture or, in an adapted form, attached to an existing wheel.

Bigger, Cheaper Beef Gains From New Hormones



Results of experiments with Synovex . . .

Condensed from Nebraska Farmer

A NATURAL hormone pellet implant that boosts weight gains in cattle by one-half or more a day at lower cost per pound of gain has been described by Dr. R. J. Deans of Michigan State University.

The implant used in the Michigan State tests is a combination of two natural hormones—progesterone and estradiol — called Synovex. It was developed cooperatively by E. R. Squibb & Sons and Syntex of Ogden Corporation.

Three lots of yearling steers were fed identical rations. One lot was implanted with Synovex; a second group was stilbestrol-fed; the third group was designated as a control group. At the end of the three month feeding period, Deans reported that the implanted steers made an "average daily gain of 3.03 lbs. compared to 2.64 and 2.30 lbs. for stilbestrol-fed and control steers respectively."

"Feed consumption per 100 pounds gain," the report states, "was lowest for implanted steers, thus indicating greater feed efficiency due to natural hormone stimulation." Additionally, the rate of gain for implanted animals, according to the report, was significantly faster than for either of the other two lots of cattle.

Other major findings of the trials at Michigan State as described by Deans are:

1. Implanted steers showed a marked increase in appetite one week after implantation, which was maintained all during the three month feeding period. The stilbestrol-fed cattle did not show an appetite gain until about 30 days after stilbestrol feeding had been started;

2. Increased gain in implanted steers was measurable 30 days after the trial started; stilbestrol-fed cattle did not evidence increased gains until 60 days feeding with stilbestrol;

3. On the basis of slaughter performance, there were no dif-

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ferences in cooler shrink between the three lots;

4. Studies of the physical composition of the carcasses showed that carcasses from the implanted lot had a significantly higher proportion of lean and lower proportion of fat than carcasses from either the stilbestrol-fed or control groups, indicating that apparently Synovex aided in increasing muscle mass;

Broiler raisers who have had trouble with breast blisters on their birds should guard against wet litter, advise University poultrymen. Observations of 61 commercial broiler flocks in Delaware indicated that wet litter is a definite contributing cause of breast blisters.

5. Steaks from carcasses in the three lots were studied for weight loss during cooking and for tenderness. Steaks from implanted animals did not lose any more weight during cooking and were equally as tender as those from the non-implanted steers.

In addition to the trials at Michigan State, Synovex has been tested extensively in commercial feed yards in various parts of the country. The results of these tests confirm the Michigan State findings that Synovex-implanted cattle gain significantly greater weight at a lower cost per pound of gain. As a result of these findings, the product is being marketed nationally.

Synovex comes in pellet form, six pellets to a cartridge. The cartridge is loaded into a special implanting device which is then inserted into a small incision between the skin and cartilage of the animal's ear. Only one such implantation is required for the finishing period because the pellets are effective for an approximate 150-day period.

Farmers Lose "Easiest Money"

In North Carolina alone, farmers lost $500,000 of the "easiest money of the year", say Extension Specialists. In terms of effort required, this easy money could have been theirs by the simple procedure of answering three questions: name, address, and the number of gallons of gasoline used on the farm. Less than 10,000 Tarheel farmers filed for a refund on gasoline used on farms during the first six months of 1956.

Tetra Petkus Rye Has No Peer

A new rye is making history in many sections of the country. Have you tried it?

Condensed from Rural New Yorker

Carl Ross

"TETRA PETKUS has no peer among the cereals from a standpoint of amount and quality of pasture"—was the enthusiastic comment of a Kansas farmer who grew this new crop in 1955 for the first time.

From the Midwest, from the Northeast and the Northwest, even from parts of the South, many farmers comment favorably on the forage and grain yields of Tetra Petkus rye.

This year, the impact of Tetra Petkus on farm productivity is shown in statistical reports. The decline in rye acreage, apparent in the past, seems to have been reversed and farmers find it again profitable to plant more rye. Also, the average grain yields per acre seem to have been boosted by the new crop. The official Crop Report of July 1, 1956, prepared jointly by the U. S. Department of Agriculture and the Pennsylvania Department of Agriculture, states that in Pennsylvania "the rye harvest will include an increased proportion of the high-yielding Tetra Petkus variety."

The expanding use of Tetra Petkus puts its stamp on the Northeast's agriculture in more than one way. In the past, it was customary to ship in ordinary rye seed from the Midwest for sowing as a cover crop here. Now trade reports indicate that these shipments are tapering off; locally grown Tetra Petkus is being used. Further, the requirements for milling rye of the big cities in the Northeast are expected to be met, to an increasing extent, from locally grown Tetra Petkus.

A milling and baking laboratory of the U. S. Government compared Tetra Petkus with ordinary rye grains over the past two years. This investigation found flour yields and protein content of Tetra Petkus somewhat higher than those of ordinary ryes grown under similar conditions. More significant, the laboratory submitted a loaf of bread made with Tetra Petkus and loaves made with other rye flours for a "blind" taste test to a panel of

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15 people. Two of them found no appreciable difference among the loaves. But 13 out of the 15 judged the loaf made with Tetra Petkus superior.

It would not be surprising if the demand for rye bread and for breakfast cereals made of rye would increase in the future; not only because of the superior taste of Tetra Petkus but also because the proteins of rye are more valuable for man's health than those of wheat. Thus, the expanding production of rye is likely to meet an expanding market.

The breeder's work does not stop with the technique of developing tetraploid rye.

This past season the Agronomy Department at the University of Maryland had an observational plot to compare tetraploid ryes of various types. While at the time of this writing the plots were not yet threshed, an observation of the stands showed the superiority of Tetra Petkus, grown from imported stock, over the various other strains.

As a further aid in maintaining the purity of seed stocks, a registration and certification program has been instituted this past season, the eligibility being based on a limited number of generations removed from the foundation stock. Registered Tetra Petkus seed, such as grown on the Ralph Styer farm in Lycoming County, Pennsylvania, will be available for the first time this Fall to growers who want to produce certified seed.

Irish Potato Has Been In America 237 Years

On a spring day in 1719, an Irish immigrant carefully dropped a small seed in a field at Derry, N. H., and the first white potato was planted in North America.

Now — 237 years later — plans are under way to erect a lasting memorial to the white or "Irish" potato.

The field is on the Murdock farm near West Running Brook, owned by Mrs. Caroline Murdock White, whose ancesters settled on the land.

There has never been a permanent shrine to the potato, so a committee was organized "to promote plans for a memorial to the United States potato industry at the site of America's first potato field—Derry, N. H."

In 1719, the Rev. James MacGregor led a flock of 16 Irish immigrant families with him to Derry, bringing with him a package of seed potatoes. The settlers planted a two and one-half acre clearing, and the following winter potatoes kept them alive.

—From the Irish Digest, Dublin

They Self-Feed Lambs and Like It

These sheepmen have proved that self-feeding can be done and that good profits can be realized from spring lambs . . .

Condensed from Farm Journal
Dick Braun

FAT LAMB prices usually get frisky in early spring when lamb marketings are light and demand picks up. Big reason marketings are light is that most farmers shy away from this market because of the extra work it takes to hand feed dry-lot lambs.

But more and more feeders are finding that they can self-feed grain with no more death losses, often less, than from hand feeding.

They're sold on self-feeding because:

- It cuts labor by two or three hours a day on a bunch of say 500 lambs.
- Lambs gain faster when self fed.
- Bunch makes more uniform gains, because timid ones aren't bossed away from the feed.

Self-feeding offers a chance for the first time, to mechanize lamb feeding.

The set-up need not be elaborate. Jerry Anderson, for instance, stores his mixture of corn and linseed meal on the floor of a bank barn. The Kendall County farmer then pulls a slide and the mixture drops into a self-feeder below.

Or you can do the job with mechanical-unloading wagons. They've won a place among beef and hog feeders—save just as much backache for the sheep man.

One Michigan farmer borrowed an idea from a poultry-raising neighbor and put in a continuous chain drag feeder.

While cutting work is the thing that sells self-feeding the hardest, most feeders find their lambs fatten faster.

"You can get almost any lamb fat in 45 to 60 days if you let him have all he wants to eat," vows George Frelk, Monier Sheep Company, Aurora, Ill. Frelk has watched thousands of lambs fattened this way in the Aurora area, and has never seen it fail if the lambs are put on feed right.

What about death loss? That's usually the first question from people who haven't self-fed.

Surprisingly, death losses are *seldom* higher than with hand

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

feeding, and often less.

"I've lost only 47 lambs out of 2,700 I've fed," says Bill Monier, who runs a feedlot on his farm in DeKalb County, Ill. That's less than 2%.

Says Alex Harvey: "We've lost fewer lambs than when we hand fed. Then we expected a 5% death loss. So far with self-feeding it's been under 3%." He hopes to cut that further with a night light at the feeder. Then lambs won't rush out and load up first thing in the morning.

Why fewer losses? Hand-fed lambs gorge themselves at feeding time. The bullies get more than they should. And a new hired man may unintentionally overfeed, or fail to kick all lambs up to the feeders at once.

But you can lose lambs on self feeders, too. Especially if you don't get 'em started right.

Here's the way most veteran self feeders get their lambs started:

They feed hay that's not too rich (high in protein) to the new arrivals. Then they give them fresh, clean water after 6 to 12 hours. Most wait from one to two weeks to worm. This varies with the condition of the arrivals. Some vaccinate for over-eating disease a couple of weeks before lambs are worked up to full feed.

Be sure you have enough bunk pellets, gradually substitute corn for oats. Others begin with a light feeding of straight corn. Once lambs have the taste of corn you can probably increase by about ¼-pound a day.

When they get up to 1½ lbs. of corn a day they may start to vomit and scour. But unless death losses get severe, don't cut back on feed.

Once settled down on full feed lambs will eat from two to three pounds of corn a day, another pound of hay, and should be limited to 1/8 to ¼ pound of oil meal. Corn and oil meal pellets feed down well in a self-feeder.

Some feeders like C. S. Force, Kalamazoo County, Mich., don't like to self-feed shelled corn. Force uses ground ear corn, adds 300 pounds of oats, 300 pounds of a 38% protein supplement and 200 pounds molasses to each ton batch.

He starts lambs on one pound of this mixture per day, and works up to a full feed in two weeks. Last year he lost only two lambs out of two double-deck carloads.

The Miller Brothers, Branch County, Mich., like a 70% corn —30% hay combination once they get lambs used to this much grain.

They chop hay into a mixer-truck that stands on a scale. When the scale beam lifts, they stop. They then add shelled corn which drops in from an overhead bin. Next they add enough protein to make a 12% ration.

Peaceful Atoms

The promise of atomic energy to agriculture lies in the prospect it offers of greatly increased knowledge about plants, animals and the soil.

Condensed from The Country Guide

H. S. Fry

THE FIRST atomic theory was put on record about 400 B.C., but it was not until the beginning of the 19th century (about 1808) that an English chemist and schoolmaster, John Dalton, enunciated the first scientific atomic theory.

The events of the last 60 years, since the discovery of the electron in 1898 and the explanation of radioactivity in 1902, have not only modified Dalton's theory about the atom, but have definitely put the civilized world on the way to what is now called the atomic age.

By 1939 when World War II opened, the military importance of atomic energy was realized by very few scientists, among whom was the late Albert Einstein. He, together with three other refugees from Nazi and Fascist countries, brought the matter to the attention of President Roosevelt. By 1943, construction of a factory was started in the United States, and by the summer of 1945, enough of the critical Uranium-235 had been prepared, at a cost of about a billion dollars, to produce at least one atomic bomb. This first atomic bomb, was successfully tested on July 16, 1945. The second and third were dropped on the Japanese cities of Hiroshima and Nagasaki, on August 6 and 9, 1945. After these events the world knew more than it cared to remember about atomic warfare.

Not long after the war scientists began to turn their attention to more peaceful uses for atomic energy.

It was the new knowledge developed via atomic bomb research which made it possible to expand peaceful uses for atomic energy. The fact that radioactivity represents the disintegration of matter, and that an isotope is a form of a natural element, which reacts chemically as does the natural element, but is of a different atomic weight, has opened up immense possibilities for the use of radioactive isotopes

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in medicine, agriculture, biology and industry.

By the time of the first International Atomic Energy Conference held in Geneva, Switzerland, in August, 1955, nearly 1,300 different isotopes had been found in nature, or produced artificially. Of these, some 800 are radioactive, and about 150 had already proved useful in the fields mentioned above. Radioactive cobalt-60, carbon-14, and phosphorus-32 are among the isotopes of elements most frequently used.

Two principal uses for radioisotopes in agricultural research have been found. One, used principally in plant breeding, is irradiation, with a view to the production of one or more useful mutations, or "sports." A mutation is the sudden appearance of a plant in a field or garden, which is distinctly different in one or more characteristics, from the seed or plant from which it came. Moreover, it will breed true. Nature produces mutations from time to time, but they are comparatively rare. Irradiation can be counted on to do it many times as rapidly.

Not all mutations, however, are desirable. Only a few can be expected to make a definite contribution to plant or varietal improvement. Nevertheless, they are much cheaper and much more quickly obtained than by the standard method of cross-breeding, followed by several backcrosses and adequate testing, which normally requires ten or more years. From irradiation to a supply of seed sufficient to sow a large acreage, might take as little as five years, where a desirable mutant is discovered.

This type of work was first done in Sweden. It was started in 1951 at the University of Saskatchewan, where a stiffer-strawed Montcalm barley was sought and eight promising mutations secured, including five produced from the same material at Edmonton. This method is being used at many U. S. institutions with quite a number of satisfactory results.

At the University of Manitoba, Professor L. H. Shebeski is continuing the work he initiated while at Saskatoon. Irradiated potatoes have produced a smooth-skinned Netted Gem, and a light-colored Pontiac. Irradiation is also being used with some tomatoes and apples.

For the most part, however, radioactive isotopes are used as tracers, in studies of what goes on inside of plants and the bodies of animals.

One of the most useful, and ultimately, perhaps, most promising uses for radioisotope tracers is in the study of photosynthesis. This is the process in which the radiant energy from the sun, together with carbon dioxide and

water, are transformed through the agency of chlorophyll, the green matter of plants, into carbohydrates, such as sugar, starches, cellulose and gums.

The carbohydrates of plants are the sources of energy to animals that eat them. It is worth remembering, however, that this energy, secured primarily from the sun, is originally produced by nuclear reaction in the body of the sun, which is fundamentally of the same nature as the reactions that result in the atomic energy released by man. A great deal has so far been learned about photosynthesis, but all of the processes involved are not yet understood.

A foolish man may be known by six things: Anger without cause, speech without profit, change without progress, inquiry without object, putting trust in a stranger, and mistaking foes for friends.
—American Proverb

Another factor of just as much fundamental importance in the growth of the plant as the process of photosynthesis is the way by which light controls the processes of growth. It is known that these processes are controlled by a plant-growth hormone called auxin, or indolacetic acid. What is not known yet is the substance within the plant that this hormone combines with to exercise this control.

Another area in which radioisotope tracers have been very useful is in tracing the way in which plants secure and use their food supplies.

These radioisotopes are sometimes called tagged atoms, because wherever they go inside the plant, or animal, they can be traced with a Geiger counter, which can register the energy they are constantly giving off. Radioactivity represents disintegration, or decay, of the atoms. Each radioactive isotope has a constant rate of decay, or what is called its half-value period. This is the period required for the isotope to decay to one-half its original value.

Half-value periods range from as short a time as one second for one or more isotopes, to as much as several months, or years. Consequently, radioisotopes suitable for tracers must have a half-life, or half-value period, long enough so that the element or process to be observed can be watched long enough for adequate study. Nevertheless, the Geiger counter will still trace almost infinitesimally small quantities of the isotope. For example, if an isotope has a half-life of 14 days, only a quarter of it will remain at the end of 28 days. After 98 days only one part in 128 will remain, or less than one per cent, but so sensi-

tive are the Geiger counters that whatever does remain could still be traced.

With this tool in the hands of research workers, it has been suggested that the greatest advance has been made since the invention of the microscope. If, for example, the use of fertilizer is to be studied, a known percentage of the fertilizer is made radioactive, mixed thoroughly with the remainder and the uptake of the fertilizer as plant food traced and carefully recorded. It is possible to take an X-ray photograph of the plant itself and find out how far the radioactive fertilizer has progressed up the stem and into the leaves, and down into the roots. Information secured in this way will eventually be utilized to the benefit of the farmer in a great many ways.

Entomologists studying the life history of harmful insects to discover the most economical methods of control, also make use of radioisotope tracers. By this means they can follow the burrowing of a wire worm under the soil, note where it travels and arrive at a better understanding of how it gathers its food supply, or damages the crop.

Systemic insecticides, those which are injected into the plant and kill the insect while it is feeding, can also be watched and the extent to which they spread throughout the plant carefully noted.

Almost every time an agricultural scientist tackles any farm problem, it helps enormously to know what goes on inside the plant or animal, and find out as exactly as possible how and where the damage done affects the working of the plant or animal parts or organs. Plant pathologists, too, who study plant diseases, are not only to use the isotope tracer method where it will be useful, but they are in a position to co-operate with the plant breeders, in the hope of developing varieties, perhaps by means of mutations, which will possess some resistance to the disease.

Wherever livestock are produced for profit, it is of the greatest importance that as much as possible be known of the basic biological, or life, sciences. This applies not only to genetics, which deals with breeding, but to nutrition, which has to deal with beneficial and harmful feeds and their effects on the body; to physiology, which deals with the many different organs and parts of the body and the way they function; as well as to biochemistry which studies the innumerable chemical processes that go on constantly inside the living body. Much knowledge has been gained during the past 20 years on all of these subjects, but the

availability of radioactive isotope tracers opens up a greatly enlarged opportunity for much more detailed knowledge.

Dairy cattle production, for example, which is based on the ability of the dairy cow to produce milk in the most economical quantities, stands to gain very greatly in the years to come, from a more complete knowledge of various processes which ultimately lead to the production of more milk per cow, from minimum quantities of the right kinds of feed. Animal diseases too, such as acetonemia and bloat in dairy cattle, can be studied much more successfully by this method. So also can a better understanding be obtained of the process of fermentation in the paunch or rumen of the cow, as well as the digestibility of such important elements in feeds as calcium or phosphorus. Similar problems exist in poultry and can be studied with equal facility.

At the Michigan State College of Agriculture very interesting work has been done with fruits, and it is now argued on the basis of experiments with radioisotope tracers that plants can absorb nutrients not only through the roots, but also through the foliage, fruit, twigs, trunk, and even the flowers. It is even being suggested that trees that have been injured by the winter may be helped to recover from this injury by giving them a proper diet at the right time. They have found, also, that cotton gauze soaked in radioactive phosphorus and radioactive potosh could be wrapped around the branches of trees and that these nutrient materials will climb up a branch 18 inches to two feet, within two days. The prospect of what may be learned for the benefit of the fruit and vegetable grower from the use of radioactive isotopes is exciting.

All of these applications of the peaceful atom are, of course, quite aside from the immense possibilities of using atomic power for heating and lighting.

What all of this means to the world in general is that atoms for peace in agriculture promise to draw the world away from hunger at a more rapid pace than ever before. For agriculture, it will mean that farmers must be better informed than ever before, to transform the new information about plant and animal production into economical farm practices. For the scientist it means an opportunity to serve agriculture and through agriculture the world of human beings, as never before. For governments, it means that while agricultural research money has paid off abundantly in the past, it will be even more profitable for society as a whole, in the future.

Your Neighbor May Be A Crop Reporter

It takes thousands of farmers and specialized reporters to dig up the facts on crop yields . .

Condensed from Pennsylvania Farmer

Robert H. Williams

ONE DAY late in August, Frank K. Moore of Somerset County, Penna., finished chores early. It was a bright afternoon and he wanted to take another look at the corn field before supper.

To thousands of Pennsylvania farmers this walk was important. Mr. Moore's purpose was to forecast the potential corn crop in his locality for the Federal-State Crop Reporting Service in Harrisburg. Across the state, hundreds of other volunteer crop reporters were also arriving at estimates for their immediate area.

Mr. Moore set his guestimate at 70 bushels of shelled corn per acre and mailed his farm report. In Harrisburg his estimate joined 1,500 others from every segment of the state and was run through a battery of business machines. Then came the official corn forecast for Pennsylvania. It was 55 bushels per acre on September 1.

In mid-September, we drove down to Somerset County with Elmer R. Nordberg, the man who translates the hundreds of local reports into the state forecast each month.

Our purpose was to visit Mr. Moore, an 81-year-old retired farmer who has been reporting crop conditions in his area for 64 years. He was first initiated into the select group in 1892 when he helped his father fill out the monthly "quiz" for the state. He later assumed full responsibility for the local reporting task when his father died.

According to Mr. Nordberg, the Somerset County man probably has the longest record of continuous service of any crop reporter in the United States.

Mr. Moore was born and reared on a general farm near Trent. He can remember when his dad was happy to get three dollars a hundred for dry fed steers. "The hide is worth more than that now," he commented.

Prior to the founding of the crop reporting service, farmers were at the mercy of buyers. They had no information on state crop and livestock conditions, let alone regional or national, and

Reprinted by permission from Pennsylvania Farmer, Pittsburgh, Pennsylvania

were often talked into selling cheap on a rising market.

Today, Pennsylvania apple growers know crop conditions in Washington almost as well as they do in their own county. And cattle feeders can buy and sell animals only after a careful look at cattle numbers and the quotations elsewhere.

Mr. Moore is only one of 39 general crop reporters in Somerset County. There are 2,400 general crop reporters in Pennsylvania, or one for every 54 farms. The big sample increases accuracy of these monthly releases. For the September 1 report, 1,500 replies were averaged. That's one for every 86 farms in the state.

The questions Mr. Moore answered for that report dealt with corn, oats, potatoes, tobacco, soybeans, various hays, pasture, apples, peaches, pears, grapes, cow numbers and milk production.

The federal-state crop reporting service also depends on specialized reporters for information. Besides the 39 general crop reporters in Somerset County they have 50 dairy reporters, 16 poultry reporters, 17 potato reporters and three fruit reporters. These men and women get questionnaires dealing with their specialties. According to Dewey O. Boster, chief statistician in charge of the Pennsylvania office, "it takes approximately 15,000 volunteer reporters to dig up all the facts on Pennsylvania agriculture.

Farmers are avid readers of these farm statistics. So are equipment manufacturers, feed salesmen, fertilizer manufacturers, canners, dairies and farm program planners to name a few. The impact of these reports is felt in the wheat pits of Chicago and the wool pool of Tioga County. Advance tips on the monthly federal crop report would make millions for crooked speculators.

To guard against this possibility, all information from Mr. Moore and his fellow crop reporters is kept confidential and state reports are drawn up in a cloak of secrecy. Later, the state summary is sent to Washington where statisticians and crop experts are locked in a suite of rooms until the federal crop report is drafted. On the final day work begins at 5 a.m. It usually takes six or seven hours. And, when the monthly report is finally released at 3 p.m., all news services and newspapers get the information at the same minute.

To keep the report as realistic as possible, fieldmen from state offices are called in to Washington to help with the final report.

Officers guard the entrance and no one is allowed to leave. Shades are drawn and sealed,

and all telephones disconnected.

The crop reporting service tabulates 600,000 crop questionnaires each month in order to bring the nation's crop picture into sharp focus. Backbone of the organization is Mr. Moore and his counterparts in the rural regions of the state and nation.

Mr. Moore has seen a lot of changes in crops and crop yields since he filled out his first crop report. If a person had to point out one major change in agriculture over the past 60 years, the Somerset County native would choose farm machinery.

"Haying was all hand work then," he said. "Now a farmer just puts a cushion under his seat and steps on the gas."

But he also gives a lot of emphasis to improved practices and varieties. He said a farmer would brag in Somerset County 60 years ago if he harvested 14 bushels of wheat to an acre. "I talked with one farmer recently who has made 52 bushels of wheat to an acre."

A Farmer's Prayer

By *Samuel R. Guard,* Editor of Breeder's Gazette

Good Shepherd of the Countless Days, We Thank Thee for herding 365 of them into this New Year.

Bless each dawning as it comes gamboling down the cutting chute of time. And in each twilight accept our lullaby of praise that we have life abundant and work that is honest. Help us to tend each precious day rejoicing, as for the lost sheep found.

Time-Keeper in Heaven, this Earth Thy footstool, help us to check every new day in this New Year as that extra full-turn of the globe—more time to do better by the least of these, Thy children.

We do have more than 5 barley loaves and 2 small fishes, all Thine, Oh Lord, to bless and break and feed much people, so that we may all hear Thy Word and do it in every day of every year for evermore.

In every day, of every year, for evermore!

AMEN.

New Farm Crop Drying Building

Oats, corn, alfalfa were dried successfully in Wisconsin's new idea, drying shed . . .

Condensed from "What's New In Farm Science

A NEW CROP drying building at the University of Wisconsin did a good job with oats, corn, and alfalfa last year, but the designers believe there are still some ways it can be improved.

The building construction was finished early enough last year to dry one batch of 400 bushels of oats and some 5 tons of first cutting alfalfa.

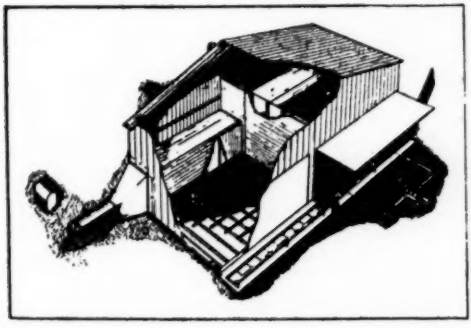
According to H. D. Bruhn, who designed the building, the oats were dried from 18% to less than 8% moisture in less than 8 hours drying time. This was a small batch, Bruhn says, and he thinks he'll get better drying efficiency this year with each side of the building filled to capacity (1,000 bushels).

The alfalfa came in at about 50% moisture and was dried to 8% in one night.

About 20 tons of second cutting alfalfa and 10,500 bushels of shelled corn produced on the University farms were dried later in the season. Bruhn says.

The alfalfa went into the drier with moisture contents varying from 20% to 40%. Drying started around 5 p.m. and the hay was dry by morning.

The corn that was dried was harvested by a picker-sheller, brought to the drying building, and drying was started as soon as the floor was well covered. A



Here's a cut-away view of the crop drying building. Though some improvements are possible, the building did a good job with corn, oats, and alfalfa last year.

Reprinted from What's New In Farm Science, University of Wis., Madison, Wis.

24 hour operation reduced moisture content of 1,000 bushels by 12%, Bruhn figures, or about ½% each hour. This corn dried to 14% moisture with no difficulty at all.

Doing good is the easiest way to get the most out of life.

But improvements are possible, he says.

For one thing, elevators for unloading the dried crop are not yet finished. Hay, especially, is a problem because the dried forage loses nutritious leaves if it's blown into the mow, and unloading by hand is a hot and dusty job.

Drying efficiency can probably be increased, Bruhn says. Next year, he plans to try reusing some of the heated air. Air loss through cracks isn't serious, he says.

We see things not as they are, but as we are.
—H. M. Tomlinson

Bruhn reports that five farmers have built crop drying buildings, and seem pleased with their first year's results.

Market Hog Weights

Selling hogs at correct weights of around 200 pounds is the easiest and surest way to raise the market, reports Richard Hollandbeck, Purdue University extension swine specialist.

Feeding hogs to heavy weights is an expensive practice. Heavy hogs eat more feed per pound of gain. And, what's more important, the end product from these heavy hogs is refused by consumers. The oversized cuts are usually too fat and end up on a bargain counter.

Market prices serve as an expression of supply and demand—not just the total of each, but the kind of supply and the kind of demand. Hollandbeck says there's a world of difference between three 200 pound meat hogs and two 300 pound fat hogs. The tonnage is the same, but the kind of supply is in sharp contrast.

The discount on a 300 pound hog is three times as great as it seems, the swine specialist revealed. He said the discount applies to the original 200 pounds as well as the extra 100 pounds. While the number of farmers who feed hogs to 300 pounds are few, the 250 pound feeders are far too numerous. —*Indiana Extension*

Liming Is Urgent in the Midwest

Midwest farmers may realize as much as $25 for each dollar invested in lime . . .

Condensed from Plant Food Review

Emil Truog, Emeritus Professor,
University of Wisconsin

THERE are not one, but many good reasons why farmers who have acid soils should use lime. Perhaps the best reason one might give to a farmer is that it not only pays, but pays handsomely.

Data obtained from many field experiments show that for every dollar a farmer invests in the judicious use of lime on acid soils he gets a return in the course of several years of five to ten dollars in the form of increased crop yields and better quality products. If the favorable effect of lime over a period of 10 to 25 years on soil fertility and conservation, and the health of the farm family and livestock is included in the benefits, the return easily may rise to 25 dollars for each dollar invested.

It is estimated that approximately two-thirds of the food output of this country is produced in the Midwest from an acreage of harvested crops which represents about 55 per cent of the Nation's total. Likewise, this area in 1954 accounted for two-thirds of the national consumption of agricultural lime. Nevertheless, Midwestern farmers barely have scratched the surface insofar as profitable use of lime is concerned.

The Midwest, commonly referred to as the North Central Region, comprises a block of twelve states with Ohio on the east, Nebraska on the west, Missouri on the south, and Minnesota on the north.

In no other part of the world does there exist a similar large area of land which, as regards types of soil and character of climate, is so well adapted for the production of a combination of the staple food, feed, and forage crops.

Large scale and profitable corn production requires a certain combination of soil and climate that is not found in many of the agricultural areas of the world. In order to maintain the needed soil fertility for high yields of corn in the Midwest, liming of

Reprinted by permission from Plant Food Review

the soils when acid is imperative.

Of the approximately 195 million acres devoted to harvested crops in the Midwestern States, about 112 million acres have been subjected to sufficient precipitation to cause severe leaching, thus creating acid soils.

Thousands of soil tests in Wisconsin lead to an estimate that of the 10 million acres devoted to harvested crops, six million acres—or 60 per cent of the total—still are acid and need on the average 3½ tons of lime per acre or a total of 21 million tons, to bring the soils represented to a pH of 6.5.

If conditions for the Midwest as a whole are assumed to average the same as for Wisconsin, total lime needs for the region to bring acid soils to a pH of 6.5 would be around 235 million tons.

To maintain this pH, once established, it is conservatively estimated that it will take about 250 pounds of agricultural lime per acre annually. This is about equal to average annual losses from leaching, crop removal and erosion.

Annual Loss Is 200 Pounds

Lysimeter experiments in Illinois, Iowa and Wisconsin indicate that in this area the annual loss per acre of bases by leaching from cropped silt loams is approximately equivalent to 100 pounds of ground limestone. If similarly, the annual loss in removal by crops beyond what is not returned in crop residues and manure approximates 100 lbs., the total annual removal would be about 200 pounds per acre of ground limestone. However, the loss by leaching in sandy soils is greater, and some loss also is incurred by erosion. Thus an overall average annual maintenance requirement of 250 pounds appears to be conservative.

Milk fever, a serious disturbance of calcium metabolism in cows at calving time, now can be controlled effectively by feeding large doses of vitamin D. Vitamin D prevents milk fever by offsetting the sudden drain on blood calcium into the colostrum.

This means that for the 112 million acres of cropped soils in the Midwest which originally were acid, a total annual application of 14 million tons of agricultural lime would be required to maintain pH at 6.5 once this level were established. Accordingly, if plans were made to bring all the soils in the Midwest from which crops are being harvested to a pH of 6.5 during the next ten years, the average annual application would need to be one-tenth of 235 million plus 14 mil-

lion or 37.5 million tons. (This does not include the lime needs of the so-called permanent pasture land.)

This 37.5 million tons is nearly three times the amount of agricultural lime used in the Midwest in 1954. Obviously, the use of lime needs to be greatly stepped up in this area.

Except for a few crops, such as potatoes, melons, strawberries, and cranberries, which in total occupy less than one per cent of the cropped land in the Midwest, all of the other crops grown here are benefited, either directly or indirectly, by liming wherever the soils are distinctly acid. This liming furnishes calcium and magnesium as nutrients, makes phosphorus and nitrogen more available, favors the beneficial bacteria, lessens occurrence of toxic conditions, makes plants more vigorous, and promotes a favorable physical condition of soils, thus helping to lessen erosion.

Alfalfa and clover constitute the backbone of a good rotation on most of the cultivated land in the Midwest; wherever the pH of the soil on which these legumes are to be sown is below 6.5, liming of the land should precede this sowing because these crops are especially benefited by such treatment.

To be assured of the desirable benefits from liming soon after application, it is necessary to apply the lime in an approved manner. Whenever a field needs three tons or more of lime per acre, it is advisable to apply one-half of the lime before plowing and the remainder after plowing. This assures mixing of the lime through the whole plow layer.

Bulk-spreading with a truck after plowing, however, may involve difficulties if the ground is rather soft or rough frozen. These difficulties may be avoided by planning ahead. For instance, if four tons of lime are needed on a sod field to be planted to corn the coming season and alfalfa the following year, it is a good plan first to apply two tons of lime on the sod, followed by discing and then plowing. After the corn is harvested, the other two tons are applied and again followed by discing before plowing. Thus it becomes unnecessary to travel over soft ground with a heavy truck.

If the old-fashioned gal was so darned innocent, how did she know when to blush?

If, however, only two tons or less of lime per acre is needed, and a seeding of alfalfa or clover is to follow immediately, application of the full dose of lime after plowing followed by discing usually is the most satisfactory.

Law on the Farm

By Norm Krausz

Second of a series on farm law by Norm Krauz of the University of Illinois Extension Service. Articles are prepared with Illinois conditions in mind. Laws in your state may differ.

Animals on Highways

Like people, farm animals seem to be attracted to the highways and roadsides. If a motorist runs into an animal and is injured or damages his car, he often asks the farmer to pay. The farmer, having lost a hog or calf, asks the motorist to pay. Although it is not possible to predict the outcome if the case were taken to court, there are some general rules that do apply:

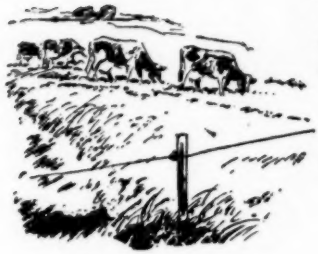
1. If a farmer has poor fences and his animals are out frequently, he can be held liable for damages caused to persons using the highway.

2. If a farmer maintains his fences in good repair, but has one or more animals that he knows are in the habit of breaking out, he may be held liable for damages caused by such animals.

3. If good fences are maintained and animals that are not in the habit of breaking out get through the fence and onto a highway, the farmer may be held liable for the damages if he knew the animals were out and made no reasonable effort to get them back in.

3. If a farmer drives animals along, across or on a highway—particularly a paved highway—he may become liable on the grounds of negligence. Under such conditions, an owner is required to use whatever care is necessary to keep his animals under control. At night or when visibility is poor, the owner must be careful to warn motorists.

5. In any of these situations, if the farmer is not negligent in any way, but can show that the motorist was careless in driving at an excessive speed, or was driving a car in poor mechanical condition, the farmer may collect for his animal from the motorist.



These Cows Make 14,724 lbs. on 2X Milking

An astonishing account of what two brothers have accomplished by building up a dairy herd . . .

Condensed from Breeder's Gazette

Eldon R. Groves

SINCE some of us dairy all our lives and never get a herd to the place where it will average 500 lbs. of fat, it might be worthwhile to study the management used in a herd which has done 600 lbs. so often it's a habit.

Last year this herd near West Liberty in Logan County, Ohio, averaged 612.9 lbs. of fat, 14,724 lbs. of milk, for 38 cows. This was the highest HIR average in the U. S. for 1955, for herds of 13 to 50 cows milked 2X daily.

More than that, there is not a cow in the herd that has produced less than 500 lbs. of fat, on an "actual basis"; and only 4 that have records under 600 lbs. The average of the highest lactations of each cow that has finished a full record is: 17,292 lbs. of milk, 4.1% test, 708.6 of fat, in 348 days, milked 2X.

Young Brothers Do The Work

Kenneth and Wilfred Lehman operate this farm. They are young fellows with growing families, who had a goal, and are now seeing it materialize. About a dozen years ago they took over the home farm as a partnership, built the new addition on the barn, and as Wilfred says, "We were in business, in debt up to our ears." Good Holstein cows, plus care, brought them through the crisis.

As happens in so many top herds, a casual visit does not show any operation different from what goes on in a thousand other dairy herds. They have standard equipment, and milk and feed along the same general lines as everybody else. The answer, then, must be in small details.

The brothers will tell you that an outstanding sire has a lot to do with it. In 1944 most of the herd was lost with brucellosis; only 8 were left to start a new herd. There are several sires represented in today's herd, but a good many of them are daughters and granddaughters of one now in artificial use in Pennsylvania, Sowiscol King Ormsdyke

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

Melchoir, whose proving now shows 14,395 lbs. of milk and 604 lbs. of fat on 26 daughters. This represents a 4.2% test, which is one characteristic of this bull's progeny. Twice last year, the monthly test on this herd showed an average of 4.6%.

Where to go for a sire to maintain this kind of a standard is always a problem. The Lehmans have tried two, and found them not good enough. They had real pedigrees and were good sires, but they didn't cross perfectly with their cattle, and were discarded.

The stable has 40 stanchions, plus some calf stalls. The cows get a little more care in winter than some, perhaps, but not an exceptional amount. Once a week they are gone over with the "Dairy-Vac," a vacuum cleaner attached to a brush.

They get not more than 35 lbs. of silage a day, and all the hay they can eat. A little more, as a matter of fact, for the mangers are swept out and the "leavings" given to the calves.

The grain mixture averages 16 to 17% protein, and the content varies a little with the price. The grain mixture is not high in protein, and the ingredients vary some with price and the supply. The usual mixture contains corn and cob, oats, bran, soybean meal, wheat, molasses and beetpulp. No rigid method of feeding is followed, but the maximum amount of grain is 16 to 17 pounds a day for the heaviest milking cows.

The Lehmans have two silos. An older one was replaced just this summer by a new silica-concrete job, 16 by 45, with a Silomatic unloader. They feed silage all summer—which is probably one point for higher production. No matter how good the pasture, they say, some of the cows like some hay and silage. And the silage is put out near the pasture and water, for a minimum of walking on hot days. The rate depends, of course, on the pasture, but on a dry, hot August day the herd will eat almost a ton of silage.

Silage and Chopped Hay

Since silage is limited in the barn to 35 pounds, quite a lot of hay is fed. They have a Fox chopper, and have chopped for years. There are three openings in the mow floor through which the hay is pushed from the mow to the mangers.

In 1955, Kenneth and Wilfred installed a mow dryer for hay, and they got some beautiful hay. They had a sample of it analyzed, and found it had 29.9% protein.

But none of the high records were made on this high protein hay. Their hay has always been field cured. Even in the winter of 1955-56, the mows were so located that field-dried hay had to be used first and not until

spring did the cows get any of the new crop.

The biggest argument for chopped hay, Kenneth says, is the labor it takes to store it. The two brothers do most of the crop work. If bales had to be handled, they couldn't do it all.

The pasture is mostly a meadow mixture of ladino, alfalfa, and brome. There are 6 lots of 5 to 6 acres each, and the cattle are shifted from one to the other to get the maximum growth and the best utilization. Fertilizer is applied every fall, usually at the rate of 200 pounds of 0-20-20.

Legend has it that the name "sirloin" dates back to one of the early English Kings. Impressed by the appearance and aroma of a platter of beef brought to his banquet hall, the king drew his sword, touched the beef and gave it the badge of knighthood by dubbing it "Sir Loin."

With the young stock, the herd usually numbers 75 to 80 head. The young cattle are in the older part of the barn, which is not designed for the most efficient handling of stock. Even so, chores are usually done by 6:30 in the evening, starting at 5 in winter and 5:30 in summer.

Cows usually freshen every 14 months or thereabouts. "We used to rush to get them bred," Kenneth says, "but we decided that was foolish. The cow needs some rest, and we want to make 365-day records." While the 305-day record should be just as valuable to a buyer, most people are not analytical enough to see it that way. The larger record always impresses folks, and since an important part of their business comes from selling stock, they plan to have full-year records to talk about. The fact that they have averaged nearly 600 lbs. for three consecutive years, indicates that not too much production time is lost by the cows.

There is some mastitis and some milk fever, as in every herd but not enough to call them a problem. They dry a cow up by simply ceasing to milk her. They say that when she gets below 40 lbs. a day, it won't hurt her to just quit, and her udder will probably be better than if partial milking is tried.

A thermostatic control regulates ventilators for the stable, and the cows are not kept too warm.

There doesn't seem to be any secret formula to making 600 lbs. of fat per cow. But the two brothers know every animal and what she is doing, so maybe the answer is two capable, efficient and thorough herdsmen.

How To Select Power Shop Tools

To-day's farm requires a well-equipped repair and servicing center . . .

Condensed from Electricity On The Farm

T. J. Wakeman, Virginia Polytechnic Institute

THE modern - day mechanized farm needs a well-equipped farm shop to maintain machinery and perform various other building and repair tasks. Carefully selected equipment, including both hand and stationary tools, are a must for quick and efficient repairs when they are required. Some thoughtful planning before buying this equipment will assure selection of the most appropriate tools for the jobs to be done.

More and more metal is being used to make equipment, buildings, fences, and conveniences. Furthermore, the farmer is becoming increasingly dependent upon the proper operation of his machinery during crucial periods of planting and harvesting. Machinery breakdowns are costly. Repairs must be made quickly and efficiently.

Spare time on cold, rainy days affords great opportunity for doing shop work. This time should be used for maintenance work on machinery to put it in top performance condition.

To do this job, do not buy "toys." Farm shops require heavy duty, durable tools wth adequate size and capacities to do the job.

Be certain to determine the availability of parts and service for the particular units you are selecting. Many manufacturers' representatives will also give training in the use of their equipment.

A general purpose grinder is usually first on the list for the average farmer. It cleans, polishes, sharpens and reconditions many tools and machine parts. A 6-inch grinder with a 1/3 hp motor, mounted on the back or below the arbor shaft (the direct drive grinder motor is in the way for sharpening mower knives), is satisfactory for average jobs. A beveled sickle stone. a 60-grit emery wheel, and an emery dresser should be obtained with the grinder. The emery wheel should not exceed 4,200 feet of rim speed per minute, the correct speed for sharpening cutting tools. This grinder is also adequate for the grinding required of the av-

Reprinted by permission frrom Electricity On The Farm, New York City, N. Y.

erage farm welding jobs.

A farm welder should be considered if much machinery is used on the farm. There is no real substitute when quick and urgent farm machinery repairs are needed. It can heat, cut, solder, melt, and braze most common metals. The welder selected should be designed for operation on 230 volt A.C. power and should have 180 ampere output capacity. It should conform to National Electrical Manufacturers' Association (NEMA) standards and should be listed by Underwriters' Laboratories.

There is hardly a man, unless insane, who would not struggle to come back if he felt that someone believed in him; believed that he could do it.

If the unit is to be used for thawing frozen water pipes, check with the manufacturer to make certain the welder will not burn out while doing this job. A dead short is required for this operation and only a few welders are made to withstand this.

For your portable drill, select a standard drill with a chuck to take round shank drills up to ½ inch size. This drill should be of the slow speed type (360 r.p.m.) to take care of drills larger than ½ inch with the ½ inch round shank. A drill stand attachment is suggested for permitting more accurate drilling of metal and boring holes in wood with less effort. Special round shank wood boring bits for electric drills are also available.

A 14 inch drill press with a slow speed attachment is the smallest practical size for a farm shop. This will take care of jobs in either metal or wood. A 1/3 or ½ hp motor is suggested. If the motor is to be mounted vertically, be sure the motor selected is designed for such vertical mounting.

Every modern farm, with the multitude of rubber tires used today, needs an air compressor. Besides inflating tires, the compressed air is useful for cleaning dirt and dust off machinery, for paint spraying, for operating pressure grease guns, and several other farm shop uses. A ½ hp portable unit is recommended for general shop use. The compressor should be rated for approximately 2 cubic feet per minute and 85 lbs. cut out pressure. Use at least a 6-gallon size air storage tank.

The power-driven circular saw will do a faster and more accurate job than a hand saw. It is useful for either ripping or crosscutting lumber. Certain models can be adapted to serve as a bench saw if so desired. Either an 8 inch

saw with a ½ hp motor or a 10 inch saw with a 1 hp motor is satisfactory for farm use.

If woodworking is to be done, a combination unit will provide a neat, compact, and versatile tool which will perform varied operations. The basic combination unit, powered by a ¾ hp motor, provides for conversions to a table saw, a vertical drill press, a wood lathe, or a disk sander. Additional attachments, powered by the original ¾ hp motor, includes a jointer, jig saw, bench grinder, and sprayer compressor.

For a table saw, a ten inch unit with at least a 1 hp motor, if hardwood is to be sawed, will provide a unit capable of cutting average farm lumber requirements without overworking or slowing down the motor.

The jointer is intended for joining the edges of boards to make them fit together. A six inch unit with a 42-inch bed is adequate for the average farm. Most units require at least a ½ hp, 3450 r.p.m. motor.

Choose the units needed for the repair and maintenance jobs you plan to do in your farm shop.

Cow Engineered an Asphalt Highway

At the upper end of Manhattan island, on the heights overlooking the Hudson river, millionaire C. K. G. Billings built a palatial mansion. While the huge edifice was going up, he addressed himself to the problem of constructing a roadway up the steep and rocky hill to the house, and consulted a friend as to how the task might best be accomplished.

"If you are in a hurry," the friend replied, "get a cow to help."

"A cow?" Billings replied.

"Yes," the friend explained. "Give her a stall on the top of the hill, then take her down to the bottom every day — and let her find her way back. Trust her to lay out a path on the easiest and most comfortable grade."

Billings adopted the idea, and, at length, the cow's meandering way was perpetuated in a smooth, winding asphalt highway.

—From The Wall Street Journal

What About Hauling Pasture to Cows?

Advantages and disadvantages of zero grazing . . .

Condensed from The Furrow
Charles P. Ellington

REGARDLESS of what you call it, the practice of chopping pasture and bringing it to the livestock can increase pasture production.

Soiling, or zero grazing as it is often called today, means cutting and hauling green forage directly to the cows. Cows are kept confined in the feedlot and not allowed on pasture at all. This system takes the work away from the livestock and puts it on the shoulders of the farmer.

The practice of soiling or green feeding isn't exactly new. We've all cut green crops to feed cattle when pastures were short in summertime. Many times we found it was more convenient to do it this way than to fence the area and let the cows graze for themselves.

But that is *supplemental feeding.* Today, modern machinery makes it possible to practice soiling for *full-time feeding.*

Direct-cut forage choppers, self-unloading wagons, and well-planned feed bunkers allow you to practice soiling with a minimum of labor, making it practical as a full-time feeding system.

Advantages of Soiling

Soiling offers you these advantages:

1. You don't need fences. (Except around your feeding area.)
2. Cows can eat all the forage —none gets tramped down and wasted.
3. You can keep more cattle per acre.
4. Taller-growing grasses combined with legumes can be used to best advantages. (What you can't green-feed, you can put up as hay or silage.)
5. Soiling usually lets you give forage 20 to 30 days to recover before being cut again, increasing production and lengthening the life of the stand.
6. You can watch your cattle more closely, since they're confined to a small feeding area, thereby reducing the hazard of bloat.

Disadvantages

1. Soiling requires more labor during the growing season. (Forage must be cut at least once a

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day and some prefer twice a day in hot weather.)

2. The switch to soiling usually requires an increased initial investment in machinery and feed bunks. However, this can be a profitable investment if the system is well planned.

3. Soiling calls for careful management. (Not only crops, but also of cattle).

Although there seems to be some increase in weight gains of beef animals and in milk production from dairy animals under the soiling system, most of the benefits come from the fact that more animals can be supported on a given amount of land.

Yields per acre can be increased enough to make the system profitable on many farms in the eastern United States. Carrying-capacity increases, from tall-growing grass and legume pastures, have been as high as 15 to 20 per cent over the system of grazing five or six fields in rotation.

Soiling can be practical and very desirable on many farms with an intensive dairy or beef operation. This may be especially true on average-sized farms where land values are high and it is desirable to increase the herd size on the present acreage in order to make a more efficient operation.

After studying reports from cooperating dairy farmers who tried soiling, University of Illinois dairy specialists say the average cost for machinery to do the chopping and a man to operate it was 6 cents per cow per day. Of the 26 who kept records, 11 chopped twice daily, 12 chopped once daily, and 3 varied their practices.

It Pays to Prune Young Pine Trees

If the lower branches are pruned from young trees, they will develop clear, knot-free wood that retails at a premium of as much as $300 per thousand board feet, of $15 to $20 more per tree. Cooperative work by USDA and Michigan Experiment Station foresters shows that pine at the 16- to 35-foot stage can be pruned 3 times at 4 -to 5-year intervals in a total of 10 mintues per tree. The foresters also point out that some grades of clear pine lumber are now retailing for more than $400 per thousand board feet, while lower grades with sound knots sell for less than $100. So, even if the pruning added only $100 value per thousand and the pruning cost was compounded annually at 5 per cent for the waiting period, the pruning operation would still return about $10 per tree.

—Agricultural Notes

Fairness-to-Both Farm Leases

Equal opportunity to both parties is the most important detail of any farm lease . . .

Condensed from The Ohio Farmer

H. R. Moore

BACK IN THE DAYS when horse power meant horses, we knew an old Scotsman who had his rule for judging them. He would say: "The thing that counts in a horse is a good set of shoulders. If a horse can get his forequarters over the hill his hindquarters always follow."

About the same logic can be applied to lease terms and management on a rented farm. The terms of a lease influence how a farm is operated, how it is maintained, and whether or not both parties remain satisfied with the deal.

About a third of Ohio's farm land is operated under lease. As a practical matter, most farmers and most land owners, sooner or later, have occasion to use a lease contract.

Several general principles apply to any farm lease regardless of whether it is a cash or a share agreement or whether it is written or unwritten. Reduced to a few words, a good lease should:

Provide for and allow profitable farming.

Give a fair division of returns between landowner and operator.

Provide for a system of farming which will maintain or increase productivity.

Give some assurance that if a good job of farming is done the lease will continue over a period of years.

Let us put ourselves in the place of a landowner and prospective tenant who are trying to work out a lease contract. How can they build these four principles into a farm lease?

Take the first one—"provide for and allow profitable farming." Of course, no one should expect a lease to make a profitable business out of a farm which does not have the potential capacity. On the other hand, a

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lease should not handicap management. So far as possible, the lease should take into account and be built around the management practices which offer the best use of the available land, capital and labor.

For example, what crop rotation is best suited to the farm? What livestock? What can the owner or the operator do or furnish to best advantage? Who is taking responsibility for maintenance of the various improvements on the farm—buildings, fences, drainage system? Are additional improvements needed such as lime, tile, or changes in buildings? If so, who is in position to do what? What special privileges can the owner offer the tenant? What special reservations does the owner wish to retain?

The foregoing are the type of things which should be talked over and agreed on at the beginning of the lease term. But, the process of reaching agreement involves some figuring and bargaining. And, this brings us to the second principle—a fair division of costs and returns.

The idea of a fair division of returns means simply that the land-owner and operator bear costs in the same proportion as they share in returns.

People who are parties to leasing arrangements try to achieve fairness by one of two methods. One is to follow the rule-of-thumb method of doing what is customary in the community. The second method is to more or less estimate and bargain over items necessary to make a lease fit the circumstances on a particular farm.

An important point is that no two farm operating units are exactly the same. More often than not a lease should be tailored to fit the farm. The idea of fairness implies a willingness to adjust the details of the lease if and when experience indicates a lack of balance.

The essence of a successful lease is fair dealing, the ability to work together, and the willingness to make the adjustments indicated by experience or changing conditions.

The third point is that the lease should provide for a system of farming that will maintain or increase productivity. Profitable farming over a period of years is dependent on maintenance of the soil, other real estate improvements and the productive ability of the farm family.

As compared with owner-operation, lease terms impose an additional set of contractual relationships on management. Often the tenant is more interested in current profits than in future productivity because he may have to move next year. His interests, however, can be better geared to

the long-term view if the agreement provides that he be paid for the value of unexhausted improvements if he must vacate the farm before recovering his costs. When a lease is made the owner and operator should at least agree on this in principle. Then,

The best temperature for dairy barns seems to be between 40 and 50 degrees, say Michigan dairy specialists.

as occasion arises, a supplemental agreement can cover the details of a specific situation.

A fourth principle in farm leases "assurance that if a good job is done the lease will continue over a period of years." Frequent moves are not only bad for the farm operator, they are bad for the farm, the farm owner and the community.

How can frequent changes by tenant-operators be avoided? Some say: "with longer term farm leases." Others say: "keep the contract equitable by adjusting it, if necessary, every year." Take your choice. Perhaps observation of experience on Ohio farms is worth noting. The tendency is to lease for one year with a mutual understanding of automatic renewal so long as everybody is satisfied.

Observation indicates also that the agreed-on length of term has less influence on the actual length of tenure than the ability of people to get along with each other. This is something which every landlord and tenant should strive to furnish by a willingness to give and take, and by mutual respect for each other.

In other words, if the business is profitable and the costs and returns kept equitable to both parties, there is *less reason for dissatisfaction and termination of the contract. So, we say again—the lease needs to take* into account and allow for all the things which contribute to good management.

A common question is—"should a lease be in writing?"

Sheep top all other farm animals in their ability to utilize pasture plants.

Let us skip the question of a lease as a legal instrument and think of it as a tool of management. If the terms of a lease are worked out methodically, if everything is considered which affects the interests of the two parties, some paper and pencil work is usually necessary. It adds up to a lot of detail which may be forgotten before another year rolls around. From a management standpoint, if a formal lease is not drawn, an unsigned memorandum covering details is a lot better than trusting to memory.

A Milking Parlor on Wheels

Story of an Oregon farmer who has three dairy farms but only one milking parlor . . .

Condensed from Western Dairy Journal

Jim Flint

WITH three farms scattered around the Astoria, Ore., countryside, Bruce Jurgensen was confronted with the problem of where he should build a milking parlor for his Grade A dairy. He finally came up with a solution —a milking parlor on wheels.

Rolling north from Los Angeles, Calif., on the highways last month was his dream—a 62 ft. long "mobile milker."

Here are 10 of the advantages he tells, all of which "add up to easier operations and greater returns per dollar invested."

1. Doesn't tie capital up on a "built-in" structure. This is especially useful and important where the farm can be adapted to other types of agriculture.

2. Cattle can be kept on a complete pasture rotation program. Maximum grazing of pastures is obtained this way.

3. "Hiking time" is reduced for cattle moving from pasture to milking parlor. This will give greater production.

4. During winter, the mobile milker can be pulled right alongside an inexpensive loafing shed.

5. A dairyman leasing his farm can put in the exact equipment he wants, and then take it with him when he leaves.

6. Special night pastures are not needed as the mobile corral fences can be moved as required.

7. A "divided" dairy farm can be operated more efficiently and with less capital investment.

8. Previously inaccessible pasture lands now can be brought into full production and use.

9. Lending agencies seem more inclined to make loans quicker than on a permanently installed system.

10. Truck can be unhooked and driven right to the creamery, bulk tank and all. This will help reduce milk hauling costs.

Thirty-year-old Jurgensen grew up on a dairy near Astoria. Hard-working and industrious, he has coped with problems on a farm for as long as he can remember.

Like most practical dairymen, finding the solution to a need

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generally results in tinkering.

From Jurgensen's tinkering first evolved a working scale model. Then came the formation of the Beclar Corp. And now the first of what may become a booming business is in practical use on his Meadow Lane Farms.

His 2-unit, self-contained, mobile milking parlor became a reality with the aid of Pat Casey, Sr., of Los Angeles, a former naval officer and an engineer.

The two had met when Casey was stationed near Astoria.

First of the units was designed for Jurgensen's operations and is a 5-stall parlor, mounted on a 6-wheeled, 3-axled trailer. The washroom and milk tank are housed on the 2-ton truck which pulls and powers the entire unit.

Just under 12 ft. high, the milking parlor measures 9 ft. wide and 40 ft. long. The truck is 8 ft. by 18 ft. When in operation, a 4-ft. catwalk, rubber hose and electric wires connect the two parts of the "mobile milker."

Future models will be offered in 3- and 4-stall sizes. And they will have one movable wall so the unit can be condensed to 8 ft. and thus be eligible for licensing on the highways.

At the present time, a special permit is needed to take the extra-wide trailer down the roads. However, it appears likely, said Jurgensen, that an interpretation will be made classing the "mobile milker" as an implement of husbandry. Then, like a combine, it can be moved over the streets when necessary and without license or permit.

The unit is self-contained. And its inventor and builder point out that it "meets all milking parlor requirements of all the Western states."

Power from the 2-ton truck through the PTO operates the equipment in the field. Also, it is so arranged that when near a power line, the mobile-milker can be "plugged in."

Besides the five conventional, in-line parlor stalls, the 2-piece unit is equipped with a 325 gallon water storage tank, a 60 gallon hot water heater, a 400 gallon cold-bottom farm tank especially designed for the unit, and pyrex glass pipeline milking equipment.

From under the floor of the milker, steel step-ramps slide out. Each step is 5-inches high and 12-inches deep.

Entrance is at the rear, and the cattle can walk straight in. Exit ramp has been designed to slide out at an angle. This makes it easier for the cows to see exactly where they're going and eliminates any 90 degree turns.

Optional equipment, mounted in the first model, includes vacuum operated entrance and exit doors that the milker can work

from the center of the trailer.

A real labor-saver is the optional special milker's seat. Mounted on wheels, it is an electrically chain driven seat that moves the entire length of the trailer. Milking without standing is possible.

Automatic feeding with a conveyor-feeding system also is optional. The present model has a capacity for about 75 cu. ft. of mixed feed.

Other equipment that is to be installed at the buyer's choice includes the make of truck, cooling fans, a vacuum or cold wall tank, the brand of milking equipment, and corral fencing.

Jurgensen plans to have movable corrals. Using single-strand, electrically charged wire, he can rotate his holding corrals so as to make best use of the pasture. "Juice" will come off the mobile milker's generator.

Cost? According to both Jurgensen and Casey, this mobile milking parlor will be below the cost for a comparable permanent type parlor.

As for financing, the two men seem to have ample assurance that getting the capital backing by a dairyman is one of the lesser problems. Several organizations already have approached them with offers to arrange a financing program.

Jurgensen pointed out that bankers have told him they prefer to loan money on the "mobile milker" rather than a permanent milking parlor as the collateral is easier to recover.

Next models already are being readied to be even more mobile. They'll come equipped with dual-axles—and with tracks that can be mounted right over the wheels so that even soggy pastures will prove no handicap in taking the barn to the cow.

More Production In 1975

About one third more agricultural production will be needed in 1975 than in the period from 1951 to 1953, says the USDA Agricultural Research Service. Taking a look at population trends, the research service predicts that by 1975 there will be 210,000,000 people in the United States, an increase of 25 per cent over the 165,000,000 registered for 1955. The USDA branch estimates that a 45 per cent increase in livestock production will be needed. If the increased demand for livestock and crop production should be met only by increasing acreages, another 150,000,000 acres of cropland would be needed. However, the trend toward higher yields per acre indicates that only about 25,000,000 additional acres may actually be put to use.

—*Agricultural Notes*

The Showring, Progeny and Performance Testing

An expert evaluates the trend toward judging beef cattle by the livestock scale . . .

Condensed from The Hereford Quarterly

Dr. Arthur D. Weber,
Dean of Agriculture, Kansas State College

TO MANY breeders of purebred beef cattle, scales and the weights taken on them are the sole symbols of progeny and performance testing. To them, quality, as symbolized by type and conformation, is being overlooked, and performance records, with pounds being translated into size and rate of gain, are the primary objectives.

On the other hand, to many proponents of progeny and performance testing, including both breeders and research workers, the showring is characterized, in their thinking, by arbitrary values and uneconomic fancy points. To them, the showring symbolizes more than a century of effort to improve beef cattle by selection based on visual appraisal of type and conformation. The inevitable result, they conclude, is an impractical, outmoded show type. The only way to improve the situation, they insist, would be to substitute weight records in progeny and performance testing for "eye appeal" and aesthetic values.

'Weight Stampede' . . .

Thus, progeny and performance testing has caused a considerable number of research workers and especially commercial cowherd owners, to re-evaluate the significance of showyard winnings. Many believe that testing provides a more reliable tool than the showring for beef cattle improvement. Some purebred beef cattle breeders, on the other hand, are apprehensive lest type, conformation, and quality be forgotten in what one cattleman has termed "the weight stampede."

At the risk of gaining the displeasure of both groups and being caught in the middle of the "scales versus showring" controversy, may I say that I thoroughly disagree with the viewpoints and attitudes, for and against testing, which I have just attempted to portray. It is my deep conviction that progeny and performance testing can, and in the final analysis must, combine ob-

Reprinted from The Hereford Quarterly, Kansas City 5, Missouri

jective measurements, weight records in particular, with objective, appraisals of type and conformation.

It is not a question either of using scales and liquidating beef cattle shows—or of promoting and financing bigger and bigger shows and discarding progeny and performance testing. Each has something to offer. Progeny and performance testing will have an impact on beef cattle shows, in my estimation. What its ultimate effect will be I am not prepared to say. I am convinced, however, that its influence will be beneficial and will help eventually to set forth in unmistakable terms the proper role and function of the showring in the progressive development of the beef cattle business.

Objective Evaluation . . .

To me, progeny and performance testing means an *objective* evaluation of performance with a view of making beef cattle production more efficient. More specifically, it means weights of animals, accurately determined and recorded in an orderly manner with these weights and analyses thereof, being used to select herd sires and replacement females.

Emphasis in a testing program is shifted from unrecorded visual appraisals of conformation and type, and estimates of size and weight, to birth weights, weaning weights, daily gains, etc., duly recorded for permanent record for use in breeding programs based on principles and procedures developed through research.

Progeny and performance testing is not limited to weights even though, in the thinking of cattlemen generally, it has become associated with size and weight for age to such an extent that other aspects of the program frequently are forgotten or overlooked.

Other objective measurements can be and frequently are recorded in connection with progeny and performance testing programs. For example, body measurements, dressing percentages, cut-out values, carcass weights, grades, and measurements, all have been used to a greater or lesser extent by various research workers. Likewise, calving percentage, longevity, and other traits and characteristics are being given various degrees of emphasis. Subjective appraisals of type and conformation also are being given numerical values and made a part of the performance testing records.

Consumer Preferences . . .

In my judgment, one needs to view the current situation with an air of detachment in order to appraise what is happening and why.

Everyone with any knowledge at all of the beef cattle business has some idea of what happened and why. A steadily increasing

demand for smaller cuts and the necessity for greater economy of production brought younger, lighter weight, smoother finished cattle into greater prominence on the markets. Prices reflected consumer preferences. Livestock judges responded to this development by placing more compact, thicker, blockier cattle up in the breeding classes. Packer judges, when called upon to judge steers both in carlot shows and in classes for individuals, have accentuated the trend by picking the kind of cattle they were paying the most money per pound for on the open market.

I am convinced that market preferences, expressed in price per pound of the live animal, always have and always will help significantly to determine beef type and conformation. *And I may say in passing that medium size is included in my concept of beef type.*

There is no question but that average representatives of the major beef breeds have been changed markedly in type and conformation during the past several decades. They still vary greatly in appearance, but on the average, they are not nearly as long-legged and rangy as formerly.

'Miniature Misfits' . . .

In some instances the trend toward extremely blocky, compact short-legged doubtless was carried too far. This resulted perhaps from the mistaken notion in some quarters that there was a short cut to the attainment of the ideal type envisioned by most breeders.

Perhaps I can illustrate what I have in mind by relating an incident at the Denver Show a number of years ago. The apparent short cut to the ideal appeared at this show in the form of animals more extreme in type than any exhibited heretofore, and so distinctive in certain body characteristics that even a casual observer, inexperienced in the cattle business, could not help but notice that they were radically

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In the early days of the West, an old-timer was elected justice of the peace. As usual he knew no law. When cases were brought before him he would take out, with a flourish, a fine-looking book, inside of which he had fastened a mail-order catalog. One day he thumbed the pages, put his finger on a point, and said, "You are fined $4.98. Next case!"

The defendant got up to protest. "Sit down!" his lawyer cautioned, pulling at his coattail. "You're just plain lucky he turned to 'Pants' instead of 'Pianos'."

—Credit Notes

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different from the conventional type of beef animal. They were truly the epitome of all that the packers appeared to want and that breeders were trying to produce.

Did they represent the ideal, and if so, should they win in the showring? That question may sound silly today, but it was a burning issue that morning in Denver, when Jack Turner stepped into the ring and was confronted with these bovine novelties. He was called on to place a kind of cattle that no Hereford judge had ever placed before. He did a wise and courageous thing, and because of his good judgment the Hereford breed and the livestock industry were spared a far greater misfortune than the one which is so widely discussed nowadays.

I shudder even to think what it would have meant to the breed and to the beef cattle business had Jack Turner placed those miniature misfits at the head of their respective classes instead of ignoring them until he had placed all the conventional animals, and then carefully counting down to the exact middle of the class and relegating them to a conspicuous position at that point so as to clearly indicate that they were of questionable merit. Certainly, if he had placed them first, other judges would have done likewise —and who can say where the end might have been?

Stronger Competition . . .

There is no point, it seems to me, in speculating whether the so-called comprest type would have ever appeared on the beef cattle scene had an effective progeny and performance testing program been in operation. The important thing now is to remember that it did appear and was discredited in the showring.

Not all cattlemen and college animal husbandmen approved of the shift from the old to the new type beef cattle. On the other hand, there were prominent judges, college men, breeders and packer buyers who evidenced a strong preference for the so-called typey, modern kind of cattle. Did they go too far in picking a small, pony type? A lot of people think so now, and not a few commercial cattlemen, beef cattle breeders and college men thought so in the 1930's and 1940's when this type preference was most evident in the showring.

Progeny and performance testing had its origin in research findings and beef cattle breeder experiences, but its impact on the beef cattle business was accentuated by ". . . the notion, or fact —whichever was right—that our beef animals were getting a bit small . . ."

On the other hand, in my judgment, progeny and performance testing would not have been

delayed long even without the apparent necessity of improving gaining ability and increasing size. For its development and application to beef cattle breeding were as logical and as inevitable as the use of hormones and antibiotics in beef cattle feeding.

The impact of progeny and performance testing on the individual commercial herd, among other things, should result in better gaining cattle, and, since rate of gain tends to be correlated with economy of gain, more efficient production. There is the opportunity also to improve quality, type, and conformation, but it does not necessarily follow that these improvements will automatically accompany greater gaining ability. On the basis of research data available thus far, it would appear that a breeder should select for gaining ability along with the type and conformation he prefers.

Progeny and performance testing also should result in higher percentage calf crops, greater lifetime production per cow, and increased profits.

The total effect of progeny and performance testing on commercial beef cattle should be a stronger competitive position through greater efficiency at each production phase — breeding, grazing, and fattening.

Similar effects doubtless will be noted in the purebred beef cattle business. As interest among commercial cowherd owners in progeny and performance testing continues to develop, there will be increasing demand for purebred bulls with performance records.

In this far-reaching development, I predict that scales will be used extensively, and that beef cattle shows will survive. The really important consideration is, it seems to me, that we shall come to know the true possibilities and limitations of both scales and shows.

Experiments in the Control of Sex in Chickens

A good deal of interest will be aroused by a patent relating to the sex control of chickens recently obtained by the Vineland Poultry Laboratories of New Jersey, U.S.A. The limited information so far issued indicates that the sex of the fertile hatching egg is controlled by the application of hormone solutions. The Director of the Laboratories is reported as stating that a great deal of additional study is required before the method can be of benefit in the field. This caution seems amply justified from experimental work on attempts to vary the sex of the chick embryo. —*Agricultural Review*

Life Insurance and The Young Farmer

Here's what you should know about it . . . what it can do for you . . .

Condensed from The Young Farmer

Dr. William L. Calvert, Dr. Milo Peterson, and *James Dau*

SOONER or later just about everyone runs up against the problem of what to do about life insurance — and young farmers are no exception.

The purpose of this article is to tell you a little about the basic principles of life insurance.

In its simplest form, life insurance is protection for your survivors. Life insurance companies insure thousands of people. They know, from their studies, how many of those people are going to die in a given period of time. The payments, called premiums, that you make to the insurance company are based on the cost of paying off the policies of those who die. And that's all there is to it.

You can buy all sorts of insurance policies with varying premium rates, but you should remember that straight protection life insurance forms the basis for all other types. When you pay more than the rates for straight protection, you are getting added features such as savings programs, investment programs, or endowment funds.

How do you decide which type is best for you as a young farmer? Simply figure out what your needs are and pick the insurance that best fills them.

Now, let's discuss some of the factors that will affect most young farmers' life insurance programs. One of the most important is a shortage of cash. This means young farmers are going to have to keep their life insurance premiums as low as possible.

Second, it is doubtful that farmers should use life insurance for investment. The good farmer can usually invest his extra cash in his own operation and get a return of 8-10 per cent. This is much higher than he can get from any life insurance policy. There is one exception to this rule. Our panel of authorities listed above feels it is a good idea to carry some permanent life insurance as a foundation policy.

Third, since the farmer is now making social security payments,

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he is already paying for a considerable amount of life and retirement insurance.

Last, a good insurance program will do many things for the farmer. It will protect his family if he dies, give him retirement income if he lives, build an emergency fund that is immune from creditors, and provide excellent collateral for loans.

With these points in mind, let's look at the planned life insurance for a mythical young farmer, Jack Jones.

Jack is 17 years old. He's a high school senior. His work in his supervised farming program has built a net worth of $1,000. His immediate plans call for working for his father after he graduates from high school. What kind of life insurance does Jack need?

You might think he doesn't need any—but consider this. At this age, life insurance is inexpensive. And he can afford it.

He's going to need life insurance some day, so the panel feels this is the time to start. For the first insurance the panel recommends looking ahead for the long pull and buying a policy that will act as a basic foundation for future insurance. The type of insurance recommended, therefore, is a $5,000 *limited pay life policy* that will be paid up at age 65.

The premium on this policy will be about $90.00 per year. Here's how it will help him.

First, it protects his parents. Second, it starts building up loan value which he may need in future years. Third, it will act as collateral on loans. And, last, when he reaches retirement age (65) he will have a fully paid up insurance policy with a good cash value. As you can see, there are some "extras" in this policy but at Jack's age their cost is negligible and the panel thinks, in this case, that they are well worth the price.

About 25 per cent of our total supply of meat is eaten in restaurants, hotels, clubs, school lunch rooms, hospitals and other public eating places which serve some 78 million meals a day.

Now let's assume it's six years later and Jack is 23. He has a younger brother coming up to take his place on the home farm, so he decides to go out and rent a place. He has built up a net worth of $7,000. But he needs to borrow an additional $7,000 to equip the farm he wants to rent. Here's where his insurance begins to pay off.

Jack is able to stretch his credit to the limit and borrow the entire $7,000 from a bank by signing over his $5,000 basic policy to the bank. Does this leave his parents unprotected? Not at all.

If he should die, he would owe the bank only $2,000 since his insurance would pay $5,000 on his debt. His parents could sell his personal property for about $14,000, pay the bank debt of $2,000, and still net $12,000.

Now let's move Jack on another year. He's 24 and he gets married. Should he buy more insurance? He might think so—but the panel disagrees. Here's why.

Jack's wife is young and could support herself if anything happened to Jack. By making his will out to her, Jack would leave her $12,000 (figured the same way as his parents' share in the example preceding.) This would be plenty of money to take care of her until she got established in a job.

Young farmers can't afford to leave rich widows. Farming is a risky business and the panel believes that the wife should share in the risk. By giving his wife only minimum protection, Jack has more money to put back in the farm, helping him to build a better life faster for himself and his family.

Now we'll flip the calendar ahead a couple of more years. Jack is 26 and he's passing out cigars for his new son. It's a happy day, but his life insurance needs have gone way up. His wife can no longer be counted upon to support herself. She's going to have to bring up that son. This means she's going to need a steady income until he's old enough to support himself. How much is she going to need? Jack and his wife should decide how much money it would take to support her and her son each month. Again, the panel recommends that only a minimum amount be provided.

In this case, we are going to assume that Jack's wife would live in a small town where she could buy a house for $12,000 and could live on $200 per month. Since Jack's net worth is about $12,000, his wife can sell out and buy the house free and clear. This, however, still leaves the question of where the $200 per month is coming from.

Here's where social security comes in. We'll assume that Jack has been paying into social security on the basis of earnings of $150 per month. This entitles his widow, with one child, to receive a social security check of $102.80 per month. This is pretty good but it still leaves a gap of $97,20 which is going to have to be taken care of. And this is where insurance comes in.

Jack's wife is going to need an insurance check of about $100 a month. And $18,000 worth of insurance, with the interest it accumulates payable over an 18 year period, will provide that $100 per month. That's how

much additional life insurance Jack needs.

What kind of insurance policy should Jack buy? If his finances are limited, the panel recommends that he buy an 18-year *decreasing term insurance policy.* This requires the least outlay in premiums because it's purely protection with no cash value. The words "decreasing term insurance" mean that the company will pay Jack's wife a set amount each month until the child is 18 instead of giving her a lump sum of $18,000.

The panel also recommends the policy have a "convertible" clause. This means that at any time in the future, Jack can convert to some permanent type of insurance.

If Jack dies, his wife will have his net worth, which is already enough to buy a house and will increase over the years, plus the monthly insurance and social security checks. Here's how the breakdown looks:

Social Security Payments	$102.80
Insurance Payments	100.00
Total monthly Income	$202.80
His insurance outlay per month is:	
Basic $5,000 policy	$ 7.50
Decreasing Term Policy	5.50
Social Security	4.90
Total	$ 17.90

One thing Jack hasn't provided is a monthly income for his wife after his child is 18. At this point, her social security will completely stop until she is 65. Jack would like to buy more insurance but both he and his wife agree they can't afford more premiums. They feel that his wife could get a job and take care of herself somehow.

We're going to leave Jack for a few years but first let's see what he should do about additional insurance for any more children. With one more child, his wife's social security check will go up to $120.00. If she is a good manager. she may be able to get along on this. The third child, however, will not bring in any extra social securtiy payment so he will need some more insurance.

A modern broiler-type baby chick increases its weight 40 times from hatching until market age at 10 weeks.

Now we'll take a long step and assume Jack is 35.

He has $13,000 of personal property and $7,000 in cash for a down payment. The farm he wants will cost him $27,000. He is able to borrow the additional $20,000 because the seller is willing to take back a mortgage and again his insurance program is one of the big reasons he is able to get the loan. In fact, the loan value of his basic policy has now built to about $1,100 and he can

borrow this money from his insurance company.

Does he need any more insurance at this point? Let's look at the figures and see what his wife would have.

ASSETS

Personal Property	$13,000
Land	27,000
Basic Insurance Policy (payable in the event of his death)	5,000
Total Assets	$45,000

LIABILITIES

Bank loan on farm	$20,000
Net amount of estate he would leave	$25,000
Plus a monthly income of $202.80 until child is 18.	

Since the farm requires a lot of work to get into shape, and since his son is still too young to do much work, his wife would probably sell out and move to town rather than try to farm by herself. In this case, she would have plenty of money to take care of herself. She could buy her $12,000 house, put the remaining $13,000 in the bank, and collect her social security and insurance checks.

So, even though Jack might *feel* awfully poor, he doesn't have to worry about his wife.

There's a lot of so-called "debt insurance" being sold these days and chances are good that Jack would be asked if he wanted to buy enough of this to clear the mortgage if he died. This might be tempting—and it would be a good idea if he had plenty of money. But the panel feels at this time he can use the money better on his farm.

Now we'll shoot Jack up another nine years. He's 44, he's built the farm up to the point where it's producing well, and has increased its value. He has made regular payments on his mortgage, and has added to the value of his personal property. He has just about everything he needs for farming operation. Here's his balance sheet.

ASSETS

Real Estate	$30,000
Personal Property	20,000
Basic Insurance (payable if he dies)	5,000
	$55,000

LIABILITIES

Bank Loan Balance	$13,000
Net Amount of Estate	$42,000

It looks like Jack is doing pretty well. Why bring up life insurance now? Well, that term insurance policy he took out when he was 26 has now run its full course. His son is 18. So under the social security laws, his wife could not get social security payments until she is 65.

Does this leave his wife unprotected? Let's look at her possible courses of action.

First, if Jack's son wants to continue farming, he and his mother can probably operate the place. They may have to hire some help but they should still

be able to keep up with the mortgage payments. Remember, the $5,000 basic insurance policy will reduce the mortgage to $8,000.

Or, Jack's wife may decide to rent the farm and move to town. She should be able to clear the mortgage by selling some of the personal property — and live on the rent.

Or she may decide to sell out everything. Jack's balance sheet shows his widow would have a total of $42,000 with the sale proceeds and the insurance policy. What would this do for her? Let's figure that sale and moving expenses cost her $2,000, leaving her with $40,000. And then let's figure that she buys a house in town for $12,000, leaving a balance of $28,000.

Here's what that will do for her.

If she's decided to work until she is 65 and again be eligible for social security payments, she can invest the money at 3% and get $70.00 per month from interest. With this sum, she could get by without a very large salary.

If she doesn't want to work, she can invest the money at 3% and draw $150 a month from the principal plus the interest until she is 65 if she, too, is 44 years old.

So, if Jack can't afford any more insurance, he won't leave a rich widow—but she'll get by.

Now, looking at the happy side of things, suppose Jack doesn't die at age 44. Should he take out a retirement policy? The panel doesn't think so. The way things are going for Jack, he should be in good shape, retirement wise, by the time he reaches age 65. His mortgage should be paid and he should have money in the bank. As his net profits increase, so do his retirement benefits. He and his wife can retire at age 65 and receive a social security check of $120-$150 per month—plus rent on his farm.

Now that we have retired Jack, let's back up a little and see how satisfactory his program is. On paper, it looks just fine—his premiums are low and he has provided protection for his family. But we want to emphasize that the protection provided was a *bare minimum*. And he took quite a gamble in not providing any monthly income for his wife for the years when there was a lapse in her social security benefits. The panel believes this was justifiable but it should have been agreed upon by both Jack and his wife. And, if Jack's wife had suffered a crippling accident or illness that would have made it impossible for her to support herself during these years, he should have immediately taken out more insurance.

Another type of insurance Jack

didn't have was protection insurance on production loans. The panel believes that Jack should have taken out term insurance to cover the face value of any large production loans. If, for example, he borrowed $3,000 every fall to buy feeder cattle, he should have taken out an insurance policy on that loan.

And, if Jack had been drafted, he would have had some G.I. insurance. If you have this insurance you're lucky because the rates are low—and its easy to fit into any insurance program.

In conclusion, the panel wants to reemphasize three things. First, there is no mystery about life insurance. Simply figure out your needs and buy the type of insurance that will best fill them. Second, as a general rule, farmers are wise to buy as much permanent life insurance as they can afford and supplement it as their temporary needs arise with term insurance. Third, farmers can usually get more return on their money by investing it in their own farm than in an insurance policy, but they shouldn't overlook the other values of life insurance.

And last, the example used in this story won't work for you any more than your neighbor's insurance program will fit your needs. Every farmer has individual needs. The best place for you to go for help is to a *qualified* insurance agent. Don't look with mistrust on your insurance agent. He can be one of your best friends.

Ancient Art of Using Clover Grass

'Great care must be taken of the cattle that are first put into it, lest it burst them. To prevent which, some gave them straw with it, and some stint them as to quantity; but the best way is only to turn them into it the first day about noon, when the dew is off, and in a dry day, for about half an hour, the next day for an hour, the third day for two, and then for three or four days put them in as soon as the dew is off the ground, and let them stay in till four or five o'clock in the afternoon, and after that there will be no danger especially if 'tis not too wet weather. If 'tis, be the longer before you let them stay in all night. However 'tis better for any other cattle than Milch Cows. But some sow Trefoil or Ray-Grass with their clover, which very much prevents it doing of injury to cattle; and as 'tis a grass that grows very very upright, it shoots through the branches of the spreading clover, and makes the crop much better.' —*From The Whole Art of Husbandry, 1716*

LEPTOSPIROSIS

A serious threat to profitable swine production . . .

Condensed from
Ohio Farm and Home Research
L. C. Ferguson

LEPTOSPIROSIS is a disease of swine which has been recognized as a serious threat to profitable farming only during the past five years. Undoubtedly the disease has been present in this country for a much longer period.

Leptospira pomona, the cause of this disease, is a spiral-shaped bacterium not unlike the spirochete which causes syphilis in man. It can cause the disease in swine, cattle, sheep, horses and man and may be readily transmitted from one species to the other. In fact, usually when the disease is present on a farm, both swine and cattle become infected.

Man is susceptible to the disease but there have been few reported cases in the United States. In Europe where it is apparently much more common, the disease in man has been called "Swineherd's Disease."

Leptospirosis Causes Abortion

Research at Ohio's Department of Veterinary Science indicates that the economic losses from leptospirosis in swine are chiefly the result of abortion or birth of weak or dead pigs. If the infection is introduced on a farm at a time when there are pregnant gilts or cows, then losses from abortion are likely to be quite high.

It is not unusual, in such cases, for the farmer to raise only 25 or 50 per cent of the expected number of pigs to weaning time. A summary from an Ohio farm herd illustrates what can happen when leptospirosis strikes. The 25 sows farrowed 257 pigs, 161 of which were dead at birth. Only 79 pigs, or an average of 3 pigs per sow, were raised to weaning.

Leptospirosis can be controlled or prevented by the proper use of methods which have been developed recently. Study of the disease, both on experimental animals and in outbreaks in farm herds, has given a much better understanding of just how the leptospirosis causes the damage.

The infection is ordinarily introduced by purchased animals which are carriers. Within a week

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after infection the hog develops the acute phase of the disease and during this time there is some fever and the animal may be off-feed for a day or two. In rare cases, there may be some blood-stained urine and the animal may have an arched back and will move only when forced to do so.

The majority of the swine will show so little evidence of the disease at this time, however, that it usually passes unnoticed. If there are no pregnant sows in the herd at the time of this first exposure to lepspira, the disease may gradually spread through the entire herd without the owner's knowledge.

Following the acute stage, regardless of whether or not it is recognized, many of the swine will become carriers of the infection. The leptospira become localized in the kidneys and may then be passed in the urine in large numbers. Other swine coming in contact with the urine may become infected by way of the eyes, nose, or mouth, and in this way the spread continues through the herd.

Where water puddles, ponds, or a slow moving stream or ditch are present, the leptospira may remain alive and be picked up by susceptible animals indirectly. The workers in the Ohio Station's Veterinary Science Department have also demonstrated that sows may be infected by way of the vagina at the time of breeding.

Spread of the disease can be prevented by breaking this cycle of transmission from infected urine to susceptible animals. There are vaccines available which can be used to increase their resistance prior to possible exposure. These vaccines have not been tested sufficiently to know just how much or for how long protection lasts, but certainly the spread can be reduced considerably.

Method Has Promise

Antibiotics have been used on a limited scale in an attempt to destroy the infection and thereby reduce the source of infection to other animals. Some preliminary trials indicate that this method may have promise.

The best methods of control consist of preventing the introduction of leptospirosis on the farm. In a majority of the outbreaks which have been investigated, such as that on the farm herd described here, the disease was probably introduced by buying an infected boar or infected gilts. These purchased "carriers" are normally added to a herd just prior to the time when the sows are most susceptible to loss.

Such purchased animals should be kept apart from the herd until the veterinarian has a blood test completed for both leptospirosis and brucellosis.

What's Ahead for the Family Farm?

Good management is the key to survival. Here's the story of a new agricultural era . . .

Condensed from Farm Management

Aaron Dudley

THIS YEAR 119,954 farmers will pack up and leave their places in the country.

That's one in every 40— a situation that projects the plight of the family farm into national prominence.

What is happening to the small farms of America and the families they once supported? Is this agricultural revolution—this heavy exodus from the country—a healthy or a dangerous situation?

These are the questions Congress asked when it sent a House subcommittee into the rural byways of America to put the family farm situation under the social and economic microscope.

Here's what the subcommittee found:

An average of 1,000,000 people a year migrating from farm areas to cities, a farm population down 3 million since 1950, a decline in number of farms from 5.3 million in 1949 to 4.7 million in 1954.

Conversely, they found bigger and better farms, increased mechanization, greater use of new crop varieties and commercial fertilization, improved efficiency. They found increased crop yields, higher net farm production and a general improvement on those family-operated commercial farms that have recognized this agricultural revolution as an opportunity rather than a lamentable change in the rural way of life.

Summed up the American Farm Bureau's John C. Lynn in testifying before the subcommittee:

"The most efficient farming pattern in the great majority of instances is the family unit."

Which demands a definition of the family farm.

Officially, the Congressional subcommittee appointed to study the problem defines a family farm as "a farming operation in which managerial decisions are made by the farmer and most of the physical work in the production of the farm enterprise — exceptions should be made in harvest operations—is done by the members

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of the farm family living on the farm. It should be large enough to provide a reasonably full-time job for the operator and sufficient income for the farm family."

Very often there is confusion in assuming that the small farm is a family farm and the large farm is not. Actually, the family farm can be large or small—as long as the family living on it takes care essentially of all the labor and management. True, the successful farm today is much larger and more efficient than it was 20 years ago, but that is no indictment of the operation—in fact, growth in farm size is often a tribute to efficiency. Today's successful family farm is bigger because it had to become bigger to retain its efficiency and survive in the agricultural revolution we are now experiencing.

But bigness itself is not the key to a profitable operation. Today's successful family-operated commercial farm must be more than just big enough to be an economic unit.

Management a Must

"Increasing the size of farming operation doesn't automatically lead to higher income," warns Peter Dorner and Raymond J. Penn, agriculture economists at the University of Wisconsin. "Good management still is a must —even more necessary with larger operations."

So the issue evolves itself into the fact that good farmers will survive if they're good managers, employ modern methods, recognize progress and honestly face the fact that their operation must be large enough to comprise an economic unit. Of course, whether or not it is an economic unit depends largely upon its management.

For those family farmers who refuse to recognize these rules of survival, there is no hope. As has often been said, the sharecropper, the small farmer who produces but very little for the market and the unemployed farm worker is a social problem—not a farm problem.

The fact that the small languishing farm is a major contributor to the illness of America's agriculture is a point of irritation with the nation's larger farmers.

Supports Criticized

"Price supports have maintained production from marginal lands," said a spokesman for the Arizona Cotton Growers Assn. recently. And he suggested that a free market would eliminate production on marginal lands by subsistence farmers on small plots.

The problem is elaborated upon by John H. Davis, a recognized agriculture economics expert.

"Many of the current problems in agriculture grow out of the fact that progress has taken place too much on a piecemeal basis," says Davis. "Certain phases of

agriculture have moved forward rapidly while other phases have lagged behind, thus creating pools of stagnation which have grown into farm problems.

"We have created a need for larger farm units, and have left over two million farm families stranded on units which are too small. We have increased the management and technical skills essential for successful operation of an efficient family farm without assuring income opportunities compatible with these requirements.

The number of farms of 1,000 acres and over has doubled over the last 30 years, according to the 1954 Census of Agriculture.

In 1925 there were 63,328 farms of 1,000 acres and over. By 1954 the number of farms 500 acres or more had increased 55.5% and now comprise more than 6.7% of the nation's farms.

"In brief," he says, "we have mixed the new with the old in such a hit-or-miss pattern as to cause serious disorder and maladjustment on the farm front."

And this maladjustment is what Congress is seeking to solve.

Comments analyst Davis:

"There are three million farm families with an annual gross income of less than $2,500—half of them below $1,500. Their plight is serious. Their particular problem is that they have been unable to adjust quickly to progress or take advantage of it . . . For those who elect to remain full time in agriculture and who give promise of success, we should concentrate on helping them to increase the size of their farms and to catch up with progress in terms of technical and managerial know-how."

Although Under Secretary of Agriculture True Morse things part-time jobs in industry and off-farm employment is the answer to ills of the struggling families on small farms, Congress apparently feels the answer lies in financial and technical assistance in converting to efficient operation.

To help the efficient-minded family farmer to place his farm on a competitive and profitable basis, new government forces have been set to work. Four new services have been directed at the family farm problems:

1. New liberalized financing and long-term credit for family farms through revised Farmers Home Administration regulations.

2. Allocation of additional special funds for extension service activities in low-income farm areas.

3. Additional Soil Conservation Service personnel in specified counties to specialize in work with

small family farmers.

4. Special USDA research and surveys, in cooperation with state experiment stations, directed at strengthening and development of small farms.

40-Year Loans

Small farms can now obtain loans for up to 40 years, with interest as low as 4½%, depending on the purpose for which the loan is obtained. These new type loans are restricted to owners of farms no larger than family-size. They will help farmers who (1) have adequate real-estate security and (2) are otherwise in a sound position but (3) are unable to meet their present credit obligations and need credit on more favorable terms and conditions than is currently available from other leaders.

When debts are refinanced by FHA the payments will be scheduled according to the ability of the borrower to repay. Operating loans will be made up to $10,000 to one borrower, with the money available for purchase of equipment, livestock, fertilizer, seed and other farm-and-home-operating expenses needed to carry out efficient farming operations on family-type farms. These operating loans are repayable over periods up to seven years, with interest at 5%. The government has laid $165 million on the line for this type of loan plus an additional $15 million as a contingency fund to be used if necessary.

Government agencies will work closely with FHA borrowers in supervising development of balanced systems of farming and perfecting good management practices.

So it appears that the fate of the family farm lies largely with the family farmers. They can and will survive if they adhere to intelligent management practices. They are being given technical and financial aid. The family farm does not have to disappear from the American scene—but it must modernize.

The total amount of milk used for all purposes is gradually increasing in the United States. It is now 356 pounds per capita a year (nearly one pint a day) compared to 352 last year, 348 in 1954, and 330 two decades ago. Many countries have a higher per capita consumption rate than the United States: for example, Finland (twice as much), Sweden, Australia, Norway, and Canada.

We have no more right to consume happiness without producing it than to consume wealth without producing it.
—George Bernard Shaw

How To Feed Sheep

You can cut costs, build flock health and productivity with the right feeding . . .

(Fourth of a series of articles.)

Condensed from Wisconsin Bulletin 470

RATIONS for sheep are usually simpler than for most farm animals. This is because roughage by way of pasture, hay and silage can be used in larger proportion for sheep than for other livestock.

Lambs are about the only farm animals that can be put into good market conditions on pasture alone. Fat lambs can be marketed right off pasture, at the time when they are taken away from the ewes, without any grain feeding of either ewes or lambs on pasture. Such a practice has been found both practical and economical in repeated tests at agricultural experiment stations and on many farms.

Sheep on farms therefore permit a longer-than-usual crop rotation—in this way favoring grassland farming and soil conservation.

The remarkable performance of ewes and lambs on pasture is only possible, of course, on good pasture. Usually this means rotation during the grazing season to provide rich, green-growing pasture from start to finish. For lambs especially, native or bluegrass pasture in May and June in Wisconsin—and hay, grain stubble or cornfields in July or August—does the job. No lambs should be allowed native pasture after August 1.

Hay should be leafy and green —at other seasons of the year as well as winter. Feeding sheep low-grade roughage is usually expensive and unprofitable. Poorly nourished sheep are apt to suffer from stomach worms, lung worms and other internal parasites, always a problem for the sheep raiser.

Which Pastures for Sheep?

Most pastures rated as excellent for other livestock are also excellent for sheep. These are: alfalfa-brome grass, clovers, clover-timothy aftermath, Ladino clover mixed with other legumes and grasses, bluegrass during vigorous growth, and other short or long rotation pastures. Some suggested legume-grass mixtures and rate of seeding per acre are:

Alfalfa	8 lbs.
Ladino clover	1 lb.

Reprinted from Wisconsin Bulletin 470, More Profit From Farm Sheep, published April 1956 by University of Wisconsin Extension Service, Madison, Wis.

Timothy	3 lbs.
Orchard grass	3 lbs.

★ ★ ★

Alfalfa	8 lbs.
Bromegrass	8 lbs.

★ ★ ★

Yellow sweet clover	15 lbs.
Timothy	3 lbs.

★ ★ ★

Red clover	3 lbs.
Timothy	3 lbs.

★ ★ ★

One of the best annual pastures is Dwarf Essex rape sown broadcast at the rate of 6 to . pounds; or drilled at the rate of about 4 pounds to the acre, any time from April 1 to July 1. Such a planting will be ready for pasturing from 4 to 6 weeks after seeding. One bushel of oats sown with the rape usually gives more feed and insures against a rape crop failure.

Often rye or wheat for fall and spring fit well into a pasture system. (Of the two, sheep prefer wheat.) These fields sown to soybeans—2 bushels per acre—after the rye and wheat are gone, will provide excellent August and early September pasture for lambs.

If properly managed, these and other pastures enable ewes to produce plenty of milk for their lambs which then grow and fatten surprisingly well without any grain. Acceptable market weight and condition can be reached when lambs are 4 to 5 months old.

Provide Good Fall Pasture Too

A good start in spring may have a poor ending in fall unless care is used to supply sheep with good roughage in the fall. This may be pasture alone or pasture plus hay and silage.

So-called "flushing" of ewes (feeding them excellent pasture, perhaps even grain, before breeding) will mean a better lamb crop the following spring. Two weeks before breeding the ewes should be put on "fresh" pasture. Electric fences may help to utilize this type of pasture, often otherwise wasted.

Feed Salt and Other Minerals

Sheep need salt fully as much as cattle do, and should have access to salt at all times. In Wisconsin, salt should contain iodine to prevent goiter in lambs. Feed in granulated form which is more readily eaten than block salt.

In most areas of Wisconsin, it has been found advisable to add cobalt to salt or minerals, as protection against anemia and unthriftiness. To supply both iodine and cobalt, the use of trace mineralized salt is recommended. For control of stomach worms, phenothiazine may be mixed with the salt on pasture. Salt should never be fed to sheep in block form.

If most of the roughage in the

ration is legume hay, the protein needs of the ewes are usually supplied. This is not true with corn silage or coarse hay.

Experiments in feeding indicate that large proportions of corn silage in winter rations may cause flabby lambs because of lack of lime or calcium. Corn silage should therefore be limited to two pounds daily for each ewe. Never feed sheep moldy silage or hay.

When a liberal proportion of legume roughage is fed, calcium is automatically supplied. Such legume roughage may be pasture, hay, or silage.

It is never too soon to do a kindness, for one does not know how soon it may be too late. —Ruth Smeltzer

Phosphorus requirements are usually met when grain is fed. It is still advisable, however, to feed bone meal or dicalcium phosphate to milking ewes and creep-fed lambs.

Feed Good Hay or Grass Silage

When sheep are brought in for the winter, usually about November, the hay fed should be equal to good pasture. If possible, feed only leafy *green* hay.

Legume hay is preferable to grass hay. Mixed legume-grass hay may be as satisfactory as straight legume hay provided it contains not less than one-half legumes. The old stand-by, clover-timothy hay, may also be used; or newer combinations like alfalfa-timothy and especially alfalfa-brome grass hay.

Grass hay, like timothy or mixtures of timothy with other grasses, is satisfactory if the crop has been cut in early bloom or before bloom. It is also important that grass be nicely cured to make bright, sweet-smelling hay.

Good grass or legume silage is equal to good hay for wintering ewes. Up to 6 to 8 pounds may be fed daily. Some hay should also be offered (approximately 1 pound per head). Under Wisconsin conditions, ewes would be better off if more grass or legume silage were substituted for the kind of hay generally produced. Oats silage, too, is an excellent winter ewe feed.

"Musts" In Feeding Sheep

There are a few chores in sheep feeding that are easily overlooked but very important. The best ration will be useless unless fed right.

1. Feed sheep twice daily.
2. *Always* clean out racks before each feeding. Stemmy hay left can be fed to cattle or horses, or used as straw.
3. Plan 1½ feet of rack space per ewe.
4. Feed grain or silage first; when eaten, feed the hay.
5. If hay is coarse, grassy or stemmy, feed twice as much as

when hay is choice. Sheep like leaves and fine stems. Thus, they must be allowed to "waste" coarse hay for full feeding on finer portions.

6. Rinse water tubs once daily.

7. Keep salt fresh by feeding it in loose form—a week's supply at one time.

Rations for Bred Ewes

Ewes vary a great deal in weight, depending on breed, development and condition. Therefore, a range in amounts of feed is indicated. Ewes should gain 30 to 40 pounds in weight from breeding to lambing. Keep trace mineralized salt and clean water on hand always. Feed one-half of one of the following rations in the morning, the other half at night.

First 3 Months of Pregnancy

1. Clover or alfalfa hay: 3 to 4 pounds. Corn silage: 1 to 2 pounds.

2. Clover or alfalfa hay: 3 to 4 pounds. Shredded corn stover or straw, full-fed: 1 to 1½ pounds.

3. Mixed legume and grass hay: 4 to 5 pounds. Corn silage: 1 to 2 pounds.

4. Good quality alfalfa clover hay: 4 to 5 pounds.

5. Alfalfa or clover hay: 1 to 2 pounds. Grass silage: 5 to 8 pounds.

6. With low-protein hay, such as timothy, fed perhaps with shredded corn stover or with straw, feed each ewe from ¼ to ½ pound of a 16 per cent protein dairy mixture daily during entire gestation period.

Last 2 Months of Pregnancy

To improve the ewes' general condition and to get them ready for nursing, begin feeding the following grain mixtures along with the usual roughage. (Roughage should be at least 50% legumes.) Feed one-half to one pound daily per ewe of one of the following rations depending on the quality of the roughage and condition of the ewe.

7. With hay alone
   - Ground ear corn ... 60 lbs.
   - Whole oats ..... 20 lbs.
   - Wheat bran ..... 10 lbs.
   - Linseed meal ..... 10 lbs.

8. With hay and corn silage
   - Whole oats ..... 50 lbs.
   - Ground ear corn ... 30 lbs.
   - Wheat bran ..... 10 lbs.
   - Linseed meal ..... 10 lbs.

9. With hay and grass silage
   - Ground ear corn ... 60 lbs.
   - Whole oats ..... 30 lbs.
   - Wheat bran ..... 10 lbs.
   - (No protein supplement)

10. *When corn is not available,* various mixtures of small grains can be fed. Use barley, wheat, rye and oats. However, these grains should be ground. Corn is a very important ewe feed provided not more than one pound daily per ewe is fed.

After Lambing—Until Pasture

For a few days after lambing,

keep on feeding the ewe her regular ration which should contain only a little grain. Then increase grain to two pounds per day until both ewe and lamb are turned out on pasture. The same grain mixture as shown above in Rations 7, 8 and 9 is satisfactory. Grain, hay, or silage may be omitted at pasture time. It is usually best to do a little barn feeding for a few days until the ewes and lambs are adjusted to pasture.

When a man does only what he must do, he will remain all his life in the rank and file.

Creep-feeding Lambs

Before pasturing, lambs will do better if they can feed on grain and hay in addition to the ewe's milk. Place a suitable mixture in a "creep" twice a day so that the lambs can slip in and help themselves while the ewes are eating.

Make sure the grain mixture contains 1 per cent trace-mineralized salt and 1 per cent bone meal or dicalcium phosphate.

In Wisconsin experiments, the use of antibiotics in lamb rations has not proved effective. Hormones for increasing weight gains are still in the experimental stage and as yet are not recommended.

Creep-feeding is both economical and convenient. Only the lambs can feed on the grain and hay, the "creep" being constructed so that ewes cannot get through. However, the lambs naturally will also feed on hay or other roughage provided for the ewes. In this way, young lambs can eat all they need for a good start which helps them gain fast and resist parasites later.

The following grain mixture is popular for creep-feeding.

11. Grind at first; feed whole later

Corn (no cob)	60 lbs.
Oats	20 lbs.
Wheat bran	10 lbs.
Linseed or soybean meal	10 lbs.
Trace mineralized salt	1 lb.
Bone meal or dicalcium phosphate	1 lb.

Note: It is important to feed the best quality alfalfa hay in a separate rack. Be sure to feed hay and grain twice daily to keep fresh.

Selling Lambs Off Pasture

If pasture is good and ewes are free from worms and other parasites, they can produce enough milk to make up for the grain fed to lambs before pasturing. By weaning time, 4 to 5-months' old lambs often reach weights of 90 to 95 pounds, and a market condition that will bring top price.

Marketing lambs at this time is the most desirable and profitable plan. However, disease, par-

asites or insufficient pasture may keep the lambs from being ready. Some farmers let such underweight lambs run with the ewes on pasture for a few weeks, hoping they will do better. But experience shows that this practice does not help the lambs very much, and prevents the ewes from getting rested and ready for another breeding season. It is therefore advisable to wean lambs at about 4½ months.

If weaning is done in July or August, "fresh" pasture can be used for the lambs. Usually it is not economical to grain the lambs in addition unless the pasture is poor.

If the lambs are weaned later, they should be taken off pasture and handled as follows:

Rations for Underweight Lambs or Western Feeder Lambs

Before being placed on feed, these lambs should be drenched, sheared, dusted and vaccinated for overeating disease. They should also be confined to dry lot. In the fall it is not advisable to "grain" lambs on pasture because of parasites.

The following rations are for lambs that need to be fed for varying lengths of time to reach a desirable market weight of 90 to 110 pounds. Continue on hay or other roughage to which they may be accustomed, and bring them up to grain gradually over about three weeks until they receive a full feed of 1.5 pounds daily per head.

If both hay and grain are finely chopped or coarsely ground, they may be mixed in equal parts and self-fed from the start. Otherwise, if both hay and grain are whole, they must be hand-fed separately, beginning with a very small amount of grain, perhaps a quarter pound daily per lamb at the start.

12. Corn or barley (whole or cracked) ..... 1.5 lbs.
    Alfalfa or clover hay 1.5 lbs.
13. Whole grain (mixed or straight) ..... 1.5 lbs.
    Linseed meal or soybean oil meal .... 0.10 lbs.
    Mixed hay made up of legume and grass .. 1.5 lbs.

Note: For feeding a "single deck" of about 100 lambs, this ration would amount to an average daily feed about as follows: 150 pounds grain, 10 pounds oil meal, and 150 pounds hay. Feed twice a day. Grain and oil meal may be mixed before feeding; or the oil meal scattered on top of the grain in the trough.

14. Mixed or straight whole grain ..... 1.5 lbs.
    Linseed meal or soybean oil meal .. 0.10 lbs.
    Mixed legume-and-grass-hay ..... 1.0 lbs.
    Corn (or grass) silage ..... 2.0 lbs.

The above three rations illustrate an important point in feed-

ing: where good legume hay is fed as the only roughage, no protein concentrates are necessary. However, when hay used is low in protein especially when corn silage or roots are also fed then some oil meal (or similar concentrate) must be supplied to balance the ration.

Rations for Rams

Like ewes, rams should be fed good roughage by way of pasture, hay, and silage. During the summer they may run on pasture. In winter, leafy green hays should be fed along with silage, corn stover, or whatever the ewe flock is fed.

Rams do not need grain except before or during the breeding season when they may be fed about 1 pound of a simple grain mixture daily depending on their condition. Use 3 parts oats and 1 part bran (measured by weight). Ewe's grain rations 7, 8 and 9 are also suitable.

Rams do well on a limited amount of succulent feed like silage, but mangels and sugar beets should be avoided. Do not permit rams to become fat and sluggish through overfeeding or lack of exercise. Do not use hormones.

Sheep need to be supplied with plenty of fresh water. Contaminated water is a common source of parasites. Mature sheep need about a gallon of water a day. Before the pasture season, nursing ewes may need 1½ gallons of water daily. It should be kept in mind that ice and snow in the winter are no substitute for water.

(To be continued in next issue.)

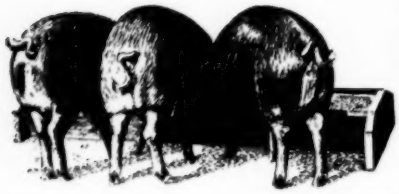
Way To Christmas Tree Profits

Christmas trees of high quality are needed to compete in tree markets of the Midwest, according to a forestry specialist at the University of Wisconsin. Fred Trenk points out that the tree of the future will probably be carefully "sheared" to provide dense foliage and a symmetrical shape.

Research in eastern states show spruces, firs, and pines are improved with shearing. Trenk points to a tremendous increase in Wisconsin pine plantations for Christmas trees and says pines need cultural treatment while still small to provide best trees.

Trenk has worked out a basic system for shearing pines and the more traditional spruce-fir-hemlock group. Initial shearing experiments are now underway in Wisconsin, he adds. Trees respond differently to shearing at different seasons and it's important to follow a careful schedule. It's also important to trim the right part of the tree. —*University of Wisconsin*

Fast Build-up for Hog Profits



Here's a quick, low cost way to improve gains and type of your market hogs . . . get the advantages of production testing and rotation breeding . . .

Condensed from Farm Profit

Lee Schwanz

YOU CAN raise market hogs next year that carry one-half of the profit-boosting potential of production testing. And by 1960, you can sell fast-gaining, meat-type hogs with 93½% production tested blood — and you can do it with very little change in your present management.

All you do is match your production-tested boars with the best of your gilts. Make a fast build-up for higher hog profits through a sound breeding program. Right now you choose a meaty, production-tested boar to mate with your selected gilts. The pigs will be 50% production tested. Mate selected gilts of those litters to another production-tested boar next fall. In 1958 you can sell pigs with 75% production-tested heritage; the third cross in 1959 will be 87½% production-tested; and the fourth cross in 1960 will be 93½% production-tested.

There is no need for you, as a commercial hog man, to send hogs to your state testing center. You don't have to keep fancy records. All you do is buy a boar with the kind of background, backed by actual figures, that can help you make steady progress toward more profitable hogs.

While you are shifting to production-tested stock, you'll want to consider the value of rotation breeding — using boars of three different breeds in sequence. In Ohio tests, 3-breed rotation cross litters made an extra 515 lbs. of pork.

Dr. L. N. Hazel, swine breeding researcher at Iowa State, says pigs from the breeding combination below have been tops in both quality and in profitable gain. Four boars, all 100% production-tested are used in rotation—Landrace, Poland, English Yorkshire, Duroc, then back to Landrace to start again.

It may be hard to duplicate

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1025 Empire Bldg., Milwaukee 3, Wisconsin

this exact combination on your farm due to shortages of Landrace and English Yorkshire stock. Other combinations do almost as well. Dr. Hazel says one of the most popular in Iowa is Duroc, Hampshire, Poland, then back to Duroc. And there is more good stock of these breeds available.

Dr. Hazel works with the Iowa Swine Testing Association which production tests hogs for breeders. Six pigs, four boars and two barrows all sired by the same boar are placed on feed. Barrows are slaughtered at 210-lbs. and carcasses evaluated.

Some owners take their boars home, others sell. Average of 100 top boars last fall was $165. These boars grew faster on less feed and had an average back fat thickness of 1.33 inches, according to Dr. Ralph Durham, sparkplug of the Iowa test.

When you pick out that boar this fall, take a long, careful look at the hog but remember that the records are likely to be worth a lot more than what you can see with the eye.

Here's what you should buy:

1. *Litter size:* From a litter of 8 to 10.
2. *Growth rate:* Weighs 200-lbs. at 5 months.
3. *Feed efficiency:* Can make 100-lbs. of gain on 300-lbs. of feed.
4. *Type:* Good meat-type with backfat thickness less than 1.2 inches.

That sounds like a big order and it is. But there are progressive producers in every breed of hogs who have hogs that meet these requirements and the figures to back them up. Several Corn Belt States have boar testing stations and are carrying out probe and weigh programs. The breed association certification of litters and production registry programs help you get the facts.

Production-testing costs money —$35 per head at Iowa State. You can expect to pay $150 to $200 for a good boar. "But a really good boar is cheap at $200," declares F. G. Kettner, general manager of Producers at Columbus, Ohio. "Any way you figure it, the extra quality of a good boar pays off big when it is passed along to several hundred pigs."

A production-tested boar can save you 200-lbs of feed on every hog. If you sell 200 hogs a year, this feed saving is worth well over $1,000. And that's not all —premiums for meat-type can bring an extra 50c or $1 per hundred in the market place.

The right boar is only half of the breeding program. Your selection of gilts is the other half. The gilts you should save are the first ones ready for market. These are the thriftiest gilts—the ones that make the best use of feed

and have the fastest growth rate. Resist the temptation to sell—those gilts are worth a lot more as breeding stock. If you select tail-enders, you've made a big step in the wrong direction.

Gilt selection should begin the day the pigs are born. Ear-notches make it possible to get figures on growth and litter production and these facts are mighty important in picking your gilts. With the facts in hand, you're ready to use your eyes:

1. *Litter size:* Choose gilts from litters of 8 to 10 pigs.
2. *Weight:* Best gilts are the first to reach 200-lbs.
3. *Soundness:* Good feet, 12 teats, well balanced.
4. *Type:* Meat-type with plenty of length. Good idea to probe for back-fat. Stay under 1.5 inches on 200-lb. gilt.

We asked college researchers what a farmer could expect from his 1957 pigs if he does a good job of gilt selection and used a production-tested boar. Here is a summary of their replies:

8 to 9 pigs weaned per litter.
200-lb. hogs at 150 to 180 days.
100 lbs. gain on 325 lbs. feed.
80% or more grading No. 1.

Compare those figures with your record this year. There's a wonderful opportunity ahead for the average producer to make a tremendous boost in his efficiency in a single year. The combination of feed saving and better type could be worth an extra $5 a hog to you in the year ahead.

Read Your Own Electric Meter

Would you like to know the number of watts a lamp or appliance uses in your home? It's very simple, according to W. T. Welchert, extension agricultural engineer for the University of Arizona.

First, you must know the "constant" of your meter. This is either on the meter name plate or on top of the turning disc. It is usually indicated by "Kh=2/3 or some similar figure.

Now, count the revolutions this disc makes in a minute while the appliance is on. Suppose a disc makes six revolutions in a minute. That means that it will turn 360 times in 60 minutes. Multiply 360 by the fraction shown on your meter (in this case 2/3): $2/3 \times 360 = 240$. The appliance is using 240 watts.

To check yourself, try it on your meter by using a known load such as a 100-watt light bulb. Being able to do this will come in handy some day. You can determine if a motor is overloaded, for example. Under a normal load, a one-horsepower motor draws approximately 1000 watts. —*Arizona Extension*

How To Grow Quality Sweet Corn

These Ohio growers apply science to the production of sweet corn and come out with a remarkable record . . .

Condensed from
American Vegetable Grower

Eldon S. Banta

ON THE sandy Miami River bottoms near Harrison, Ohio, M. C. Pottenger and sons grow each year some 150 acres of sweet corn for fresh market in near-by Cincinnati. Century Farms, as the Pottenger enterprise is known, has long been famous in its area for the production of high-quality sweet corn. Success has been due largely to the application of science to farm problems.

The Pottengers believe the first step in top sweet corn production is obtaining a high population of plants per acre, 12,000 or better. They start with good seed planted at a rate ranging from 8 to 12 pounds per acre depending upon variety.

Spacing is important in obtaining the highest number of good-sized ears. The Pottengers plant in 40-inch rows and space grains 7 inches apart in the row for early varieties and 9 inches for late varieties. An accurate planter is also essential for good stands. Even though they buy graded seed, the Pottengers regrade all seed so as to have grains as uniform in size as possible. Then by selecting appropriate planter plates, more exact plantings are made and they get a better stand.

Another factor contributing to good stands at Century Farms is the use of aldrin mixed with fertilizer at planting time. The local farm bureau fertilizer plant makes up the mixture at the rate of 5 pounds of 20% aldrin per 100 pounds of fertilizer.

The Pottengers apply this mixture at the rate of 100 pounds per acre as a starter fertilizer. This makes a band application of one pound per acre of actual aldrin which has given excellent control of wireworms, grubs, cutworms, and other soil insects. Where aldrin was not used on part of a field, the stand of plants was noticeably reduced. In this year's mixture the Pottengers used a fertilizer analysis of 5-20-20.

Rotations and fertilization go together on the Pottenger farms. Barley is a cash crop on the farms

Reprinted by permission from American Vegetable Grower, Willoughby, Ohio

and quite often this crop is used between two sweet corn crops on the same field. On others sweet corn is grown every year.

The practice has been to seed the fields to rye grass as soon as harvest has finished. In the spring the rye grass is plowed under with an application of 400 pounds per acre of 10-10-10 fertilizer.

Last year this procedure was being modified somewhat by seeding the rye grass in the corn at the second and last cultivation, thus reducing the machinery and labor cost of seeding the cover crop. The fertilizer program is now based upon a careful soil analysis program.

In years past the Pottengers have given their sweet corn a side-dressing of ammonium nitrate at about 200 pounds per acre, applied soon after planting.

Last year the program was altered somewhat by using anhydrous ammonia at the rate of 90 pounds per acre. Now the Pottengers are toying with the idea of applying 45% urea as a side dressing in place of ammonia. They feel that urea might release nitrogen to the growing corn crop over a longer period than either ammonia or ammonium nitrate.

Once a good stand of corn is obtained, the Pottengers follow modern cultural practices to maintain it. Fields usually receive two cultivations, with rye grass being sown at the time of the second. Weed control begins early with an application of Dow Premerge just before plants break through the ground, or slightly after. Care is taken not to apply this spray if the temperature is above 70° F., as some injury at high temperatures has been reported. Corn that is up and growing well usually receives an application of 2-4-D, this year the butyl ester, for control of such broad-leafed weeds as smartweed, pigweed, and ragweed. Weed sprays eliminate the necessity for a third cultivation and make later harvesting easier on workers.

Insect and disease control are begun early. Just as the first corn shoots break through the soil the first application of DDT goes on for control of flea beetles which spread Stewart's disease. Three applications are made at weekly intervals. This season the disease was present on early varieties even where sprayed. However, a small section which was not sprayed showed considerable damage from Stewart's wilt, so the DDT application paid well. One quart of DDT in 15 to 20 gallons of water was applied per acre.

Corn borer control usually requires four DDT applications of 3 quarts DDT in 15 to 20 gallons of water per acre. First ap-

plication goes on when first egg masses are found on leaves and others follow at five-to seven-day intervals.

For best control of corn earworm the Pottengers have found that they must begin spraying with DDT about a week before the first silks show, then continue with two more applications at four- to five-day intervals. They have been using a mixture of three quarts of DDT in one gallon of mineral oil, but this season may dispense with the oil since some damage has been reported from its use in hot weather.

In efficient sweet corn production it is essential to co-ordinate planting dates and acreages with anticipated harvest and market demand. The Pottengers accomplish this goal in two ways.

First they choose a succession of varieties from early to late so as to make as long a harvest season as possible. Then a given acreage of each variety is planted at intervals throughout the season. Earliest to mature are North Star and Marcross. First planting is made between April 7 and 12, and usually consists of 10 to 15 acres of each variety. Following Marcross are Goldrush and Carmelcross, then Hoosier Gold and Golden Security. Weekly plantings of 15 to 18 acres are made from April until the first of July, which results in continuous harvest from about July 1 until mid-October.

In 1954 the Pottengers installed an irrigation system. During the past three seasons it has returned a high rate of interest in the form of increased corn yields. Last year irrigation started in June and was used until the middle of September to bring a continuous high yield of over 12,000 ears per acre. Without the added water, this rate of production could not have been maintained.

Water for over half the corn acreage is pumped from the Miami River and for the remainder from a shallow well only 15 feet deep. The same pump is used at both locations, a 500 g.p.m. pump made by Construction Machinery Company and powered by a 50 h.p. Chrysler industrial motor. Fuel cost runs about $1.00 per acre.

The system was set up to water 40 acres per week. This is accomplished by the use of 1000 feet of 6-inch main pipe (Alcoa aluminum) and 3400 feet of four- and five-inch lateral aluminum pipe. In operation at one time are 25 Rain Bird sprinklers, each of 20 g.p.m. capacity. Each application is of 1¼ inches of water.

The Pottengers plan for a good stand of healthy plants per acre, then care for those plants so that each matures at least one ear of corn for market.

Fertilizer Prescriptions

In Peoria County, Illinois, farmers get fertilizer prescriptions . . .

Condensed from Better Farming Methods

Jack C. Everly,
University of Illinois

TELLING THE same story while making fertility recommendations to farmers is a big problem in many counties.

This is particularly true where commercial seed distributors, fertilizer plants, vo-ag departments, and local extension workers are performing the job without first checking signals to be sure the right applications are called.

Earl Bantz employed the soil prescription technique in solving this problem in Peoria county, Illinois, where he is farm adviser —and it was just what the doctor ordered.

It's revolutionary—the thought of getting a "doctor's prescription" to be sure you apply the correct plant food nutrients in proper amounts for the most profitable corn production. But after testing this new method during 1955, local farmers and agricultural leaders found Bantz's system works.

The problem was defined by remarks from local farmers who came to Bantz to protest against the wide variety of recommendations they would get from men who should be qualified to help them with their fertility problem.

In many of the cases this had happened: (1) No soil test during the last four years; (2) Tests had not been made at a qualified laboratory; (3) No fertilizer application record or past crop history; (4) Recommendations were not consistent with current research data nor based on reliable extension service information.

Bantz decided to salvage the deteriorating fertility advisory program with the "prescription technique" through an organization that would restore the confidence of the farmer in recommendations, and at the same time get agriculture leaders who made the recommendations thinking along the same lines.

At the Peoria County Soil Conservation district meeting, Bantz introduced the soil and crop inventory sheet, a single mimeographed page, which met

Reprinted by permission from Better Farming Methods, Mount Morris, Illinois

with a limited response from the farmer audience.

Designed to solve the fertilizer application record and past crop history problem while making recommendations, Bantz was determined to give the idea a fair trial. He called a meeting of farm managers, vo-ag instructors, soil conservation and extension personnel to revise the inventory sheet and get their ideas on how to get its acceptance by the farmers.

It was heartily accepted by the group. The approved inventory had columns for year, crop, plant food added that was subdivided into legume nitrogen, manure, and commercial; total added, plant foods removed, balance, and carry over.

The group recommended the formation of an organization patterned after the Wisconsin Pacemakers to promote the inventory idea and to weld soil fertility recommendations to one basis. This group was called the Progressive Corn Growers.

During the late winter and early spring, the group had several meetings with Dr. E. H. Tyner, soil fertility specialist from the University of Illinois.

Realizing the immediate need of getting satisfactory returns from fertilizer during the first year following application, the group with Dr. Tyner worked out a uniform Peoria county work sheet on first year requirement for maximum yields . . . which paved the way for the soil prescription.

Based on a soil test taken during the past four years, it gave the amount of phosphorus and potash needed. Based on previous crop yields and type of soil, it gave the amount of nitrogen needed to produce the desired yield.

Instruction was also included on planting rates for corn to get enough population to use the applied fertilizer effectively. At the bottom was a place for the prescription.

Because of the great amount of detail work involved, it was decided that only a limited number of farmers could participate during the pilot year. Because preliminary efforts were so successful, farmers want the Progressive Corn Growers enlarged to include anyone in Peoria and surrounding counties.

Participating farmers were sponsored by extension service personnel, farm managers, soil conservation personnel, and vo-ag instructors. At all times, the new organization remained free from connections with commercial seed and fertilizer dealers.

Fertilizer prescriptions were given to cooperating farmers to get corn yields in accordance with the capabilities of the soil on the individual farms. No goals of 100 bushels were set for the en-

tire county, but reasonable and practical goals for the individual farm.

Using a soil test taken within the last four years and the past crop history, the farmer and his sponsor figured out a prescription they thought was adequate for the desired corn yield by using the work sheet.

The prescription was then given to the Progressive Corn Growers' prescription committee composed of a farm manager, soil scientist, and farm adviser. They were usually okayed as is, because the work sheet made uniform recommendations easy.

Other requirements for cooperating farmers were: (1) To use five or more acres, leaving space for a check strip; (2) Apply plant food nutrients in any form desired, just so it met the prescription requirements; (3) To use planting rate prescribed in the prescription for maximum yield; (4) To take three plant population counts, before first cultivation, just after last cultivation and at harvest time; (5) Use a rain gauge to check rainfall; (6) To check yield.

Work of the organization was supervised by a county committee with a farm manager as chairman and a farm adviser, farm editor, soil conservationist, vo-ag instructor, and farmer as members.

Results of this new technique in coordinating fertilizer recommendations was given during a fall banquet. All except two of the farmers made money on their fertilizer applications during the first year, figuring corn at $1.15 per bushel. Many doubled and tripled their money invested.

Pelleted Rations for Lambs Give Larger Gains in Tests

Pelleted rations for lambs give greater gains than unpelleted feeds of the same kinds and proportions—but the cost of pelleting will need to come down before farmers will adopt it generally.

That's the opinion of Virginia animal husbandmen, who say tests in Kansas and other states show the increased gain when pelleted rations are used apparently results from greater efficiency of feed utilization and not from increased consumption. Tests have given best results with a ration composed of 55 per cent roughage and 45 per cent concentrates. This was the ratio that also proved most economical with the non-pelleted ration. —*Virginia Extension*

Adding Productive Power

The brood cow is the primary productive machine on the cattle farm. She reaches maximum profitable production only when her feed requirements are met.

Condensed from Shorthorn World
A. L. Ward

THE BEST feeding programs for beef cattle breeding herds are based on the fundamental concept that cattle are raised primarily as a marketing medium for farm-grown roughages and grains. Skillful cattle production employs practices which add to the efficiency and economy of converting these basic feedstuffs into nutritious, appealing human food.

The efficiency of cattle in utilization of forage, roughage, and grain depends on the inherent productivity of the herd, management skill of the herdsman, and soundness of the feeding practices used.

While the science of genetics is relatively new, skillful cattle breeders of many generations have made remarkable progress in the careful blending of the best characteristics of outstanding animals, giving today's cattlemen the most productive herds history has known. Yet, formal research in breeding problems demonstrates that a significant variation in the ability to utilize feeds exists between animals of similar appearance. The wise cattleman never forgets that only those animals which have the capacity to use good rations efficiently are truly well-bred.

Good management creates productive environment necessary to realize full benefits from well-bred, efficiently fed herds. Disease and parasite control, understanding of the requirements and reactions of cattle, close attention to details, careful planning of range or pasture use and feed production, critical analysis of market trends and use of efficient, economical, and labor-saving equipment directly affect profits from the enterprise and add value to both feeding and breeding.

Even the best cattle make efficient use of the feeds they consume only when these feeds supply all the nutrients needed. Range forage, farm pasture, roughages, and grains frequently fail to contain sufficient amounts

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of one or more essential nutrients. The nutrient content of farm and range feeds depends on the kind of feedstuff, fertility of the soil, and stage of growth when harvested or grazed.

Grains and mature roughages seldom provide adequate amounts of protein. Grasses which contain liberal amounts of protein during fast growth may be critically deficient when mature or weathered. A New Mexico Experiment Station study of range forage showed that one type of grass which analyzed 16.8 per cent digestible protein during early growth dropped to 2.4 per cent after weathering during the winter. Another grass contained no digestible protein when mature and weathered. Usually, grass hay contains only one-third to one-half as much protein as the same plant provides during excellent grazing.

Mineral Content Varies

The essential mineral content of forages and roughages also varies according to stage of maturity of the plant. In addition, a mineral deficiency in the soil is reflected in the mineral content of the plant. Critically deficient phosphorus areas have been known for many years; borderline deficiencies exist in many other areas. A few localities have a deficiency of such trace minerals as cobalt, iodine, copper, and iron. Vitamin A is found in abundance in green forage. The best hay and silage contain smaller, but usually adequate, amounts. Insufficient amounts are found in weathered pasture forage, low-quality roughage, and grains. While animals store vitamin A in the body when grazing green forage, deficiencies may occur during prolonged drouth or when vitamin A deficient rations are fed to cattle not on pasture for more than 60 days.

The true principle of supplemental feeding is to provide those nutrients which are deficient in the basic feedstuffs on the farm or ranch; it is not intended to replace them. Supplements have exceptionally high value when used to correct deficiencies. High production is maintained when supplements are carefully selected to provide this supplementation most efficiently and economically; the value of the basic feedstuffs is increased; and profits are improved. Careless selection of an inefficient supplement which requires excessive use may result in its competing with the nutrients abundantly available in the lower-costing basic feeds grown on the ranch or farm rather than correcting their deficiencies.

Sound selection of supplements is based on knowledge of nutritive requirements; approximate composition of the forage, roughage, and grain being fed; and analysis

of available supplements. When protein is the limiting deficiency, a high-protein concentrate, such as cottonseed meal or cake, is the most efficient and economical. If minerals or vitamin A are needed they should be supplied in the most economical, efficient supplement.

Grains are not satisfactory substitutes for protein. In a 3-year winter feeding trial at the Nebraska Experiment Station, heifers fed prairie hay made 74 pounds more grain when supplemented with ¾ of a pound of cottonseed cake, daily, than when 2 pounds of corn grain were fed. The research workers concluded: "For practical purposes 0.25 pound of cake was equivalent to 1 pound of shelled corn. Corn is seldom cheap enough to provide an economical substitute for cottonseed meal in wintering calves."

The need for adequate protein in the ration has been established for many years. The value of protein supplements was emphasized by a 10-year California Experiment Station feeding trial which showed that supplementing breeding cows on protein-deficient range increased the calf crop 17 percentage points and produced 117 pounds more weaning calf weight, per cow annually. Knowledge of the specific effects of adequate protein helps to under-

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stand how such improvement in production is achieved.

Protein Improves Appetite

Protein improves the appetite and increases consumption of range forage or farm feeds. In Nebraska feeding trials supplementing free-choice feeding of prairie hay with one-half pound of cottonseed cake increased consumption of hay about 25 per cent, producing 115 pounds more winter gain from 85 pounds of supplemental cake and 425 pounds of extra hay consumed. Because cattlemen primarily are marketing pasture forage and farm feeds through cattle, supplements improve the efficiency of this operation by increasing the effective consumption of these feeds.

Adequate protein is essential for cattle to utilize efficiently the feeds they consume. In preliminary protein studies at the Florida Experiment Station, about 5½ pounds of total digestible nutrients were required to produce a pound of beef gain when recommended amounts of protein were fed. When the protein content of the ration was reduced to 28 per cent of the recommended amount, about 12½ pounds of total digestible nutrients were required per pound of gain. These preliminary results suggest that the value of protein-deficient farm roughage may

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be more than doubled by feeding adequate amounts of cottonseed meal.

Needed protein supplements improve breeding performance and the ability of cows to wean large calves. In experiments which are in progress at the U.S.D.A. Agricultural Research Center, reducing the protein content of the ration to 2/3 of the recommended amount caused cows to come into heat later after calving and appeared to reduce the length of the heat period, resulting in longer intervals between calving. The low-protein ration, which actually contained more protein than cows in many herds receive during lengthy periods of the year, reduced the average weight of weaning calves 40 pounds. The difference in protein received by the two herds was about equal to one pound of cottonseed meal, per head daily.

Just as protein is most likely to be the deficient nutrient in range and farm needs, phosphorus is the most commonly deficient mineral. In fact, the decline of phosphorus percentage in forage closely parallels that of protein. This occurrence gives added value to cottonseed meal and cake as a cattle supplement because it has a higher phosphorus content than any other protein concentrate commonly fed to cattle. In areas of serious phosphorus deficiency, a mineral supplement containing liberal amounts of phosphorus should be available to cattle at all times. Such supplements as dicalcium phosphate or steamed bone meal, mixed with salt, are efficient and economical.

When ample amounts of pasture forage or roughage are available, carbohydrate supplements usually are not necessary except for show, sale, or fattening animals and creep-fed calves. Including the forage obtained from grazing, wintering cows need 18 to 22 pounds of feed, daily; cows nursing calves should consume about 28 pounds; and wintering calves and heifers require 11 to 15 pounds.

Rates of protein supplement feeding depend on the protein content of pasture forage and roughage. If extremely low-quality roughage or weathered pasture is used, wintering cows need 2 to 2½ pounds of cottonseed meal, daily; feed cows nursing calves 2½ to 3 pounds; and wintering calves and heifers need 1½ to 2 pounds. When pastures are mature, but not leached, or if average quality grass hay is fed, wintering cows need about 1 to 1½ pounds of cottonseed cake, daily; nursing cows need 2 to 2½ pounds of cottonseed meal, daily; and heifers need 1 pound. When abundant green grazing is available, protein supplements are not usually needed.

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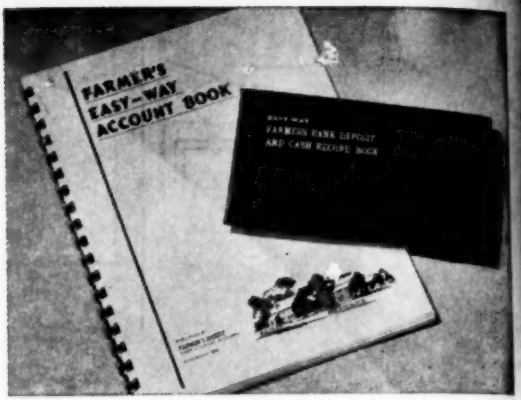

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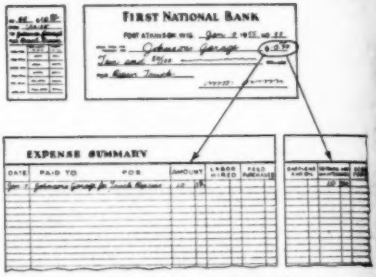

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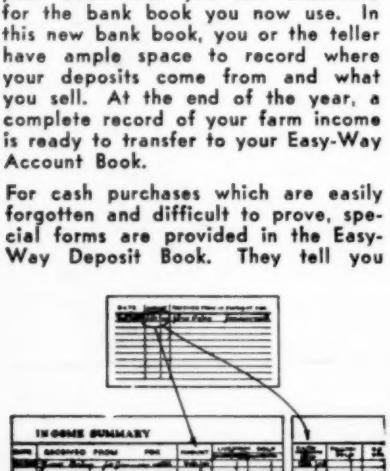

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